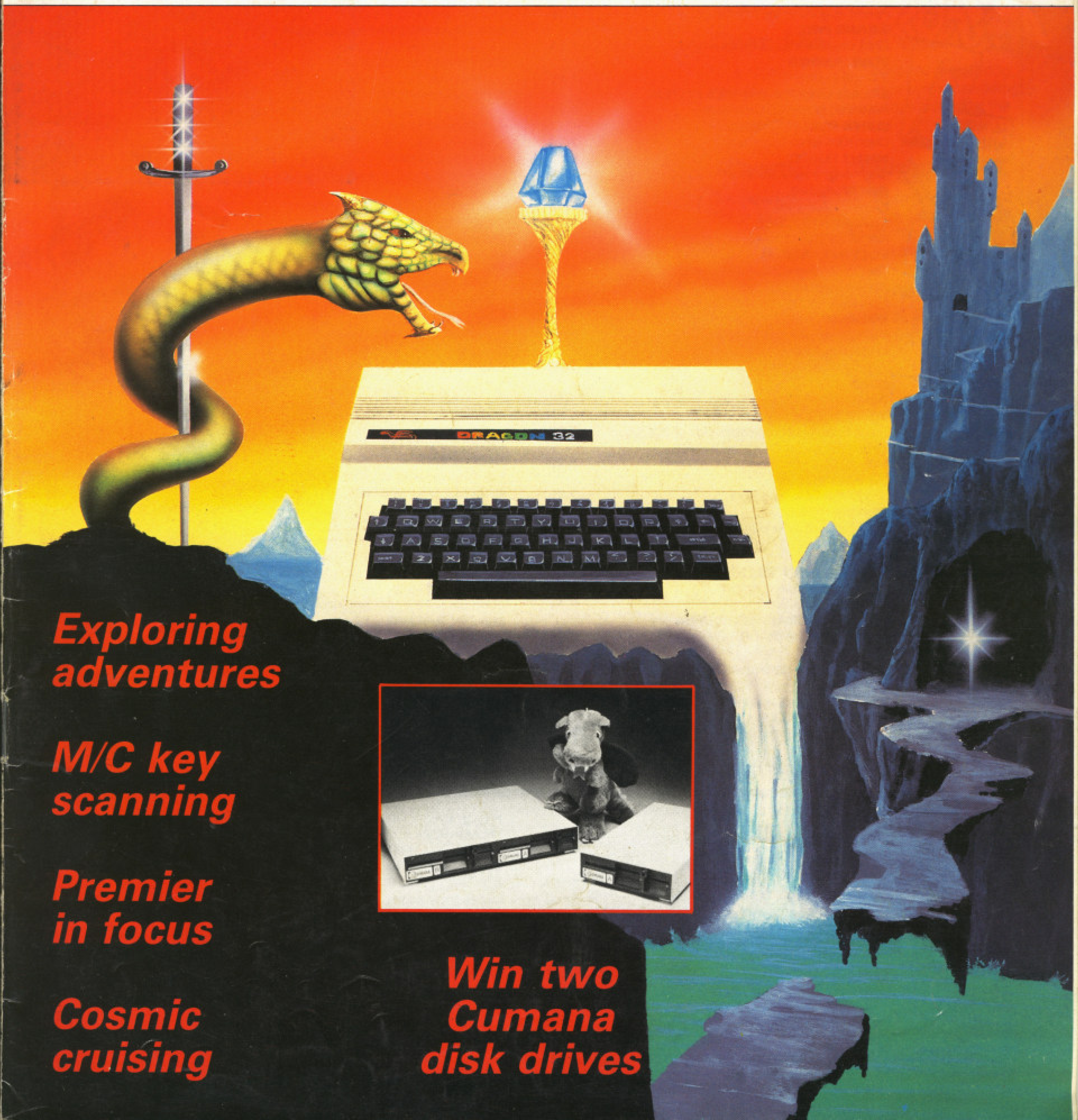
DRAGON USER

International edition

The independent Dragon magazine

75p US$3.25 August 1984



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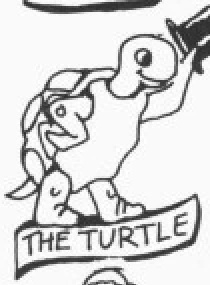
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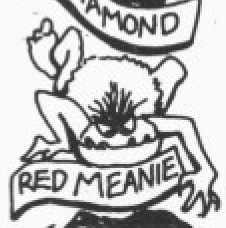
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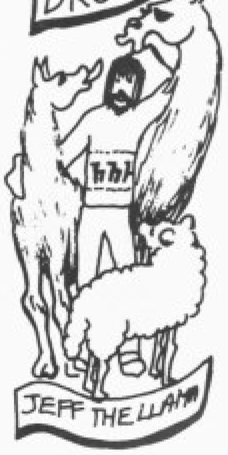
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Subscriptions
UK £10 for 12 issues
Overseas (surface) £16 for 12 issues
ISSN 0265-0177. Telex: 296275
Dragon User, 12/13 Little Newport Street, London WC2R 3LD.
US address: c/o Business Press International, 205 East 42nd St, New York, NY 100017.
Published by Sunshine Books, Scot Press Ltd. ©Sunshine Books 1984.
Typesetting by Chesham Press, Chesham, Bucks. Printed by Eden Fisher (Southend) Ltd, Southend-on-Sea, Essex.
Distributed by S.M. Distribution, London SW9. 01-274 8611. Telex: 261643
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How to submit articles

The quality of the material we can publish in *Dragon User* each month will, to a very great extend, depend on the quality of the discoveries that you can make with your Dragon. The Dragon 32 computer was launched on to the market with a powerful version of Basic, but with very poor documentation.

Every one of us who uses a Dragon will be able to discover new tricks and quirks almost every day. To help other Dragon users keep up with the speed of the development each of us must assume that we made the discovery first — that means writing it down and passing it on to others.

Articles which are submitted to *Dragon User* for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program returned you must include a stamped, addressed envelope.

Contents

SUNSHINE

Editorial

REACTION TO THE news that Dragon Data had called in the receivers was that the 32 had been killed off. But judging from our readers' response, their interest in the machine is still alive — and it is that interest we intend to continue serving on *Dragon User*.

Readers have let us know that they think "the Dragon is an excellent computer and a reasonable games machine", and that they intend to stick by it. Poor marketing is held to blame for the company's problems: "We all feel greatly let down by Dragon Data's archaic approach to marketing and advertising and their highly overpriced peripherals." (At least there was some good news here: the price of Dragon Data's peripherals fell when the receivers walked in — although make sure that if you buy the drives you get the controller cartridge as well).

The company's software came under particular attack. To quote one disgruntled reader on the subject of what Dragon users did — and didn't — need from Dragon Data: "It was most certainly not to pay the highest prices for software, a lot of which was double the price of the far superior Commodore software, and it was not to have the feeling of being an owner of an inferior machine whilst browsing the shop shelves trying to find anything at all relating to the Dragon . . . One can find a needle in a haystack easier than finding new, imaginative and original software for the Dragon." Microdeal has been far more successful than Dragon Data at picking the right games — and at marketing them. Dragon Data's first software appeared in polythene bags hung on racks, eventually being transferred into giant video cassettes. Neither looked very good, nor made much sense — the video cassettes contained booklets with acres of white space. As the same reader commented: "Dragon Data seemed intent on suicide."

Self-willed or inflicted by outside market pressure, Dragon Data's "demise" makes it even more important for this magazine to serve the needs of Dragon users. So don't forget to keep in touch — write and let us know what you think we're doing well and (heaven forbid) what we're doing badly.

EDIT+
– A true Utility

*

Some "utilities" are really not very useful when you come down to it. To be genuinely useful the software has to do something quite special – it has to be a real improvement over the way that you do things now and be convenient to use.
We looked at the DRAGON. The facilities for program development are primitive and the display is a joke. It could even put you off programming for life.
EDIT+ is a real improvement for the DRAGON. It allows you to develop programs quickly and easily, whatever they are for.
In addition EDIT+ includes HI-RES, an enhanced screen display with 24 lines by 51 characters, selectable character sets (English, French, German, Danish, Swedish, Italian, Spanish), Sprite graphics, redefinable characters, and an improved keyboard action with auto-repeat. Graphics and text can be mixed on the same screen.
To use EDIT+ you either plug in the cartridge or load the program from disk.
Tapes are fine for games – not for something you will use over and over again.
Programming can be pleasant – try EDIT+ and see how. It may even help you to make proper use of some of the other "utilities" on the market.

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EDIT+/HI-RES are available for TANDY COLOR 32k

DASM/DEMON
– The Authors Choice

*

When we wrote the DEMON monitor and the DASM assembler for the DRAGON we were confident that they were going to be popular, because they were good programs aimed at a discerning and appreciative audience.
We were delighted to see DASM/DEMON become the most regularly featured assembler in independent DRAGON machine code articles.
We were rather proud when Ian Sinclair chose our assembler and monitor for his book "Introducing Dragon Machine Code" and thrilled by his description of DASM as "The Rolls Royce of Assemblers".
Our latest accolade is in "DRAGON Machine Code" by Robin Jones and Eric Cowsill who use DASM for the worked examples throughout their book.
These gentlemen know their stuff and they picked our product. Perhaps you should too.

DASM/DEMON*	–Dragon Cartridge	£30.45
	–DRAGONDOS disk	£19.95
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DEMON	–Dragon Cartridge	£18.95

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If you own a DRAGON64 and a disk unit then you have already made a serious commitment to this computer and want the best possible performance from it.
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FLEX has the virtue, for ordinary mortals, of being easy to use and understand. That is a result of design, not accident. There are few things about FLEX that you cannot understand in a session or two of using the software.
For example if you want to copy all the files from disk drive 1 to disk drive 2 you type COPY 1,2. Nice and easy, no Ph.D. required.
Try that with your current disk operating system and you will begin to understand why we prefer FLEX.
FLEX gives you more free space for use, 48k to be exact. FLEX allows the use of single or double sided, single or double density disks of whatever number of tracks.
In other words any kind of 5" disk or disk unit. We don't want to cramp your style and if you buy software from another source for FLEX you will be able to read the disk. Try that with your current disk operating system.
We will be issuing a FLEX utility disk which will allow you to run DRAGON BASIC with FLEX. So you don't have to start again with a new BASIC. If you want PASCAL, COBOL, FORTRAN, FORTH or "C" they are available from several sources. An editor and assembler are part of the standard FLEX package.
In short, good software, reliable and easy to use – that is FLEX.

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Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2R 3LD.

Top secret

PERHAPS MR Maggs (Letters: *Dragon User*, May 1984), would be interested in my own method of preventing unauthorised access to program data.

The first time you create the data, include a temporary line at the beginning of the program: CW$ = ''ABCDEF'' (where ABCDEF is your own secret word of at least six characters in length).

You then save CW$ along with all of your other program data (that is, print # — 1). Remove the temporary line and the code-word is retrieved from tape along with all of the other program data.

Before the program allows you to proceed any further, the code-word must be entered. The method I use to enter the code-word prevents someone reading it from the screen as you type it in. The listing is as follows:

```
1 CLS4: PRINT @ 98, "Data loaded and ready for use";
2 Play "P4" : Sound 100,4
3 PRINT @ 263, "Enter pass code";
4 For A=1 to 6
5 A$=INKEY$ : if A$ = " " Then 5
6 If instr (A. CW$,A$)<> A then A=99
7 Next A
8 If A>8 then CLS: PRINT @ 266, "Invalid code": play "P1" : goto 1
```

You will never prevent one of the whizz kids from getting into your program but you can make things hard for them. The above method combined with the disable list method should prevent most unauthorised eyes from gaining access.

S J Jones
Great Barr
Birmingham

A stitch in time

WITH reference to Peter Hooton's "Survival" program in May's issue of *Dragon User*, much typing can be saved if lines 1230-1640 are deleted and the following amendments are made:

```
1230 FOR J=1 TO 10
1240 IF J/2<>INT(J/2) THEN LINE (0,L(J)) – (HL,L(J)) PSET ELSE LINE (256,L(J))–(256–HL,L(J)), PSET
1250 IF ST=J THEN 630
1260 NEXT J
1270 VL=VL+6
1280 IF VL>192 THEN VL=192
1290 FOR J=11 TO 20
1300 IF J/2<>INT(J/2) THEN LINE (L(J),0)–(L(J), VL), PSET ELSE LINE (L(J), 192) – (L(J),192–VL), PSET
1310 IF ST = J THEN 630
1320 NEXT J
```

Colin Wilcox
Brooklands Estate
Manchester

Tandy and Dragon

I WAS A little surprised to see a listing for a Tandy-Dragon converter in June's *Dragon User*, since many have been either advertised or reproduced in various forms. Some time ago I decided it was necessary to have one, mainly in order to facilitate exchanging programs between Tandy and Dragon owners, and promptly set about writing one. It required some ideas and information from a number of people to produce it and so is not exactly all my own work, but has advantages over many I have seen published or advertised.

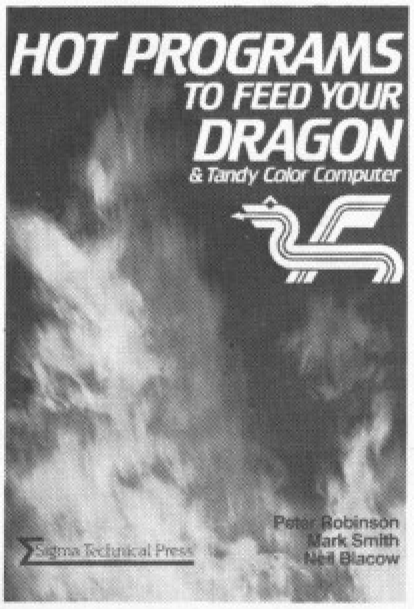
There are several problems involved including the problems of USR and EXEC functions (and in some instance PEEK's and POKE's) and the fact that some people poke graphics into strings directly; these cannot be saved in ASCII format and the string information must remain unaltered.

The point in writing this letter is that I will happily provide a copy of this program to any user in a situation where he finds it necessary to convert programs, for the minimal effort of a stamped addressed envelope and cassette. For those interested it is a 400 byte machine language program fully compatible with either a Dragon or Tandy, using a simple menu driven mechanism to determine which conversion is to take place. It ignores anything in quotes and CLEAR's its own memory to protect itself, and does not bother about PEEK's and POKE's but lists all line numbers, containing USR or EXEC.

One final point, a few users (nice people really) take the effort to write programs that will run without any trouble on either machine (this in some circum stances of course requires inside knowledge), whether to be helpful to other users or whether to make more money selling it to more people I'm not sure, but it's a pity that users cannot exchange information to make this more universal.

Robin Telkman
18 Arksey Terrace
Leeds

A RECENTLY published book that contains a utility to convert Tandy tapes to Dragon format and vice versa is *Hot Programs to Feed Your Dragon & Tandy Colour Computer*, published by Sigma Technical Press, price £6.95.



Software Top 10

1	(–)	**Buzzard Bait**	Microdeal
2	(1)	**Cuthbert in Space**	Microdeal
3	(3)	**Dragon Chess**	Oasis
4	(7)	**Hungry Horace**	Melbourne House
5	(–)	**Bug Diver**	Mastertronics
6	(5)	**Eightball**	Microdeal
7	(8)	**Sprite Magic**	Knight
8	(–)	**Dungeon Raid**	Microdeal
9	(6)	**Skramble**	Microdeal
10	(–)	**Mr Dig**	Microdeal

Chart compiled by Websters Software

Printer power

I ENCLOSE a short program of a formatter for printer output which might be of use to other Dragon Users as it helps to tidy up listings. A description of its effect together with the means of using it is embedded in the program as comments.

```
10 '★★★FORMATTER FOR PRINTER★★★
20 '
30 '★ THIS PROGRAM WILL BREAK ANY MULTI-STATEMENT LINES UP
40 '★ INTO SINGLE LINE PER STATEMENT FORMAT TO ALLOW THE
50 '★ PROGRAM TO BE READ EASIER. THE LISTING OF THIS PROGRAM
60 '★ ILLUSTRATES THE EFFECT.
70 '★ BY R A SHACKLEFORD
80 '★ HAMILTON, ML3 7LW
90 DATA 81,3A,27,01,39,D6,6F,C1,FE,27,01,39,34,36,86,0D
100 DATA BD,80,0F,C6,06,86,20,BD,80,0F,5A,26,FA,35,B6
110 FORI=&H7FD0 TO &H7FEE:READA$
120 A=VAL("&H"+A$):POKE1,A:NEXTI
130 POKE&H168,&H7F:POKE&H169,&HD0
140 ' TO USE ROUTINE TYPE POKE&H167,&H7E TO TURN FORMATTER ON
150 ' TO TURN FORMATTER OFF TYPE POKE&H167,&H39
```

R A Shackleford
Hamilton

Sunderland calling

WE WOULD like to set up a Users Club for Dragon owners in the Sunderland area. Meetings would be held at regular intervals to allow people to exchange ideas and to help each other solve any problems found with programming and so on. Other ideas could possibly include a "Software Exchange" and a listing facility for club members.

If you are interested in such an idea please contact me on Sunderland 284188 or Ian on Houghton-le-spring 844286.

Peter Theakstone
Sunderland

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The future of Dragon



Dragons on the shelf?

DIXON'S responded to the news that Dragon Data had called in the receiver by cutting the price of the Dragon 32, 64 and peripherals.

For £79.99 you can pick up a 32 and five pieces of software, while £169.99 will get you a 64. Dragon disk drives are going for under £100.

As regards the fate of Dragon Data; at the time of going to press, the receiver, Robert Ellis, of accountants Touche Ross, had received several offers. He revealed few details, but it is known that both Tandy and GEC have expressed a strong interest in the company.

Indeed, GEC paid for the GEC Dragon stand at the Earls Court Computer fair held recently. If GEC do take over Dragon Data it is thought that they will concentrate on the Dragon Professional (see *Dragon User,* July) and an MSX type machine.

As for Tandy, its interest lies with the 32 and 64, and more importantly for readers, the service and support side of the Dragon.

Unexpired warranties on products are legally unenforceable against a company that has gone into receivership, though any company that bought up Dragon would, it is expected, fulfill outstanding obligations in order to maintain good will.

As we went to press, Dragon Data were "still receiving a lot of calls and are trying to help people as much as possible" according to Derek Wiliams, technical director.

Readers who have a problem with their micro are advised to contact Dragon Data for a list of accredited service shops that have the spare parts to allow maintenance to be carried out.

To date, 52 employees have been retained at the company with a further 100 being made redundant. It is not known where the manufacture of future micros will take place should the company be taken over.

Tandy have flown people over from the USA and Europe to have a look at the plant and are keen to take over the servicing and support if nothing else.

Another company rumoured to be interested are Philips, though no further details were available. Unlike Dixons, Boots have not altered the price of its Dragon products. The company is still stocking Dragon software and will continue to do so for as long as there is a demand for it.

Dragon MSX?

RUMOURS that Dragon Data were thinking of manufacturing an MSX micro were confirmed by staff at the Earls Court stand.

John Sayers, managing director of Tandy, revealed that GEC had acquired the rights from Microsoft to be the sole producer of MSX in Britain.

The MSX concept is that micros with broadly the same hardware will all run the same software *(Dragon User,* June).

If GEC markets a MSX micro, it will have the option of adding a second chip to make the micro compatible with Dragon software.

Software on the go

A PREHISTORIC caveman, the hulk and an assorted array of football teams make their debut in some of the many new games and adventures being released for the Dragon.

From Imagine comes two new games (price £5.50 each) — BC Bill, a "fun game" which has you in the role of a caveman collecting wives, bashing monsters and feeding your wives in order for them to have babies and Arcadia, Imagine's arcade game for the Spectrum, Commodore 64 and Vic20 and now available for the Dragon.

Ostrich riding is the name of the game in Skyjoust from J. Morrison Micros, an arcade game with three different screens, each becoming progressively more difficult as you ride your ostrich killing off other riders and avoiding giant birds that lay eggs which hatch into snakes. Also from J. Morrison is Mission XK1, a machine code arcade game with joystick or keyboard options. The task is to command the SS Explorer on a dangerous mission to collect Liquid Zyphoneum whilst avoiding asteroids and other such objects. Both tapes cost £6.95.

Adventure International is launching a version of the Hulk as its first release on the Dragon, price £7.95. Taking the role as either Bruce Banner or the Hulk, the idea is to find gems in order to regain your lost power. Ants, killer bees and others are there to prevent you in your task. Unfortunately, the Dragon version is text only.



Inexpensive software is now available for the Dragon in the form of Bug Diver from Mastertronic, a company formed by four video wholesalers who produce software at the price of £1.99. The idea of the game is to dive under the water to collect eggs without being eaten by larger fish.

Scorpio Software, a new name to Dragon users, is releasing three titles for the Dragon. The first, Pratfall Pearly, is a graphics adventure with over 60 locations as you search for pearls avoiding mishaps such as being sent to prison for smuggling. Star Cargo is a defender-style arcade game and Ruby Runabout is a graphic adventure converted from the Spectrum. In this, you are Reggie the Ruby Robber and your quest objective is to steal the Rocksalmon Ruby and stash it away in your garage hideout. There are 40 locations to explore and the cassette should retail at £5.50, the same price as Star Cargo and Pratfall Pearly.

Football fanatics should be pleased by the news that Addictive Software plans to launch its 3D-graphics Football Manager for the Dragon; and from Cable Software comes news of the release of the first home computer game based on American football, entitled Superbowl. The game is being test-marketed on the Dragon 32 and if successful will be converted to other micros.

Adventure hiccup

TECHNICAL hiccups have occurred at Channel 8 with its attempts to convert the Mysterious Adventure series to the Dragon.

The company is at present waiting for the master copies of the Dragon versions to arrive from the author. Many advance orders have been received from Dragon owners and if customers have still not obtained their copies the company would like to stress that it has not cashed any of the cheques that it has received and will not do so until the orders can be fulfilled.

Norman Perriam of Channel 8 extends his apologies to users and mentioned that direct mail orders will be supplied first before the wholesalers are issued with their stocks. The reason for the delay is due to "technical problems in transferring data to the Dragon."

All 11 titles of the Mysterious Adventure range will be available for the Dragon, with full graphics versions on the 64 and occasional graphics on the 32.

Systems software

COMMUNICATIONS software is on the way from Telepost Systems, a newcomer to the Dragon scene. The company, which has specialised in developing such software for the 6809 processor (the chip at the heart of the Dragon), has recently released the first two products of a new range of communications programs for the Dragon.

The Telepost Terminal Simulator enables the Dragon 64 to operate as a terminal with a 51-character (upper and lower case) by 24-line display. It features keyboard-type ahead facilities, XON/XOFF, line overflow, character echo, automatic line feed generation, Bell code generation recognition and audible alarm.

Standard operation is at 300 bauds full duplex, though speeds of 110, 600, 1,200, 2,400 and 4,800 are available under software selection. The cartridge costs £69 and comes with connecting instructions.

Another communications package from Telepost is a disk-based data transfer utility for OS9 users. The data transfer software enables both text and binary data to be received continuously from the RS232 or other external interface and to be transferred to disk without loss of data.

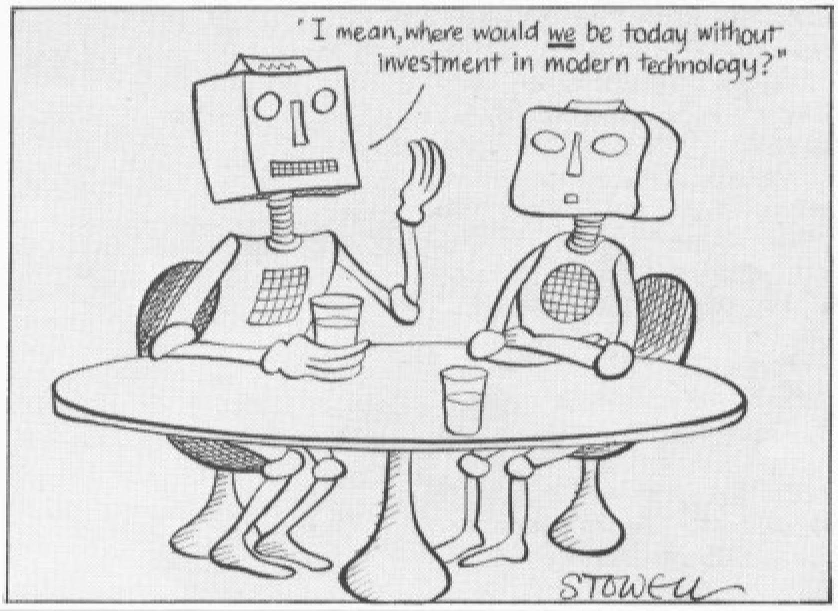
The utility is available on a Dragon format disk together with optional device descriptors for alternative speeds of operation and is priced at £30. Further details from Telepost at Loudwater House, London Road, Loudwater, High Wycombe, Bucks, phone 0494 448741.

Oxfam calling

OXFAM has launched a major appeal for computer software through its chain of shops in the London area.

Oxfam, one of Britain's leading voluntary organisations in the field of overseas aid and development, recycles all sorts of donated goods, clothes, toys and so on, and is appealing particularly loudly to readers for computer software, especially games cassettes for personal and home computers.

Manufacturers and retailers are also asked to spare some software. The appeal is mainly being launched in the London area though any of Oxfam's shops around the country can take them. In the London area contact Oxfam at 348 4225.



Flexing it

COMPUSENSE, distributors of Flex for the Dragon 64 (see *Dragon User*, April, page 12), is now offering a complete system which includes the Dragon 64, twin disks, Flex operating system, editor and assembler.

The cost of the system is £600 excluding VAT and Compusense will continue to offer the system as long as stocks of the 64 are readily available from GEC Dragon.

The Flex operating system itself retails for about £75 and is a direct rival to Dragon Data's OS9. Flex has been developed over a period of six years according to Ted Opyrchal of Compusense, and is available for a number of other micros including the Tandy, BBC computer and Motorola Exorcisor.

Good news at the fair

THE EARLS Court Computer Fair held recently in London brought good news for Dragon users.

The show saw several micro firms displaying new releases for the Dragon and vowing to continue doing so. The largest was, not unexpectedly, Microdeal with a space ship stand and a two-way TV screen to enable enthusiasts to have a chat with Cuthbert — the bespectacled "whizz-kid" featured in many of Microdeal's games.

Microdeal is releasing seven new titles for the Dragon, four of which — Time Bandit, Cashman, Downland and Demon Seed — were on display at the show. Worlds of Flight, Demolition Derby and Fury are still being worked on and should be released soon. John Symes of Microdeal said that despite what happens at Dragon Data, Microdeal will be sticking with the Dragon and has a contract with Tandy to sell the top Dragon titles to Tandy, and also has a deal with a Tandy company to obtain the titles of Tandy tapes.

Horace Goes Skiing, the successor to Hungry Horace from Melbourne House, is now out and about for the Dragon. In this version, Horace must cross a busy road to collect his skis, make his way to the ski slope and then slalom down.

Roman gladiators at the Argus Software stand heralded the release of the Fall of Rome. As commander of Rome it is up to you to prevent the crumble of the Empire as Rome struggles for survival. Also coming from Argus is Demon Knight, a text-only adventure.

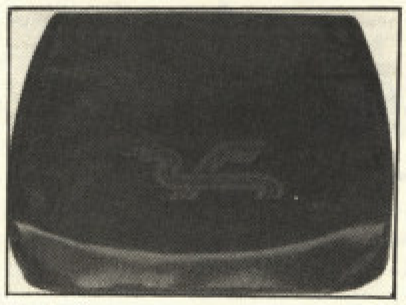
Phoenix Software had two new titles on display, Mission Moonbase and The Emperor Must Die. The company, which releases action/adventure games in twin cassette packs has also announced a price cut — its software titles now cost £6.99 down from £9.99. In Mission Moonbase you are chosen to deliver Strontium 98 fuel to Rocket Base Moon, only to find that the transporter driver has been murdered, and in The Emperor Must Die, your job, should you take it, is to assassinate the evil Emperor.

Judging by the many letters we have had inquiring into hunchback-type games, readers will be pleased to note that Ocean Software has released a version for the Dragon. Hunchback, like the arcade original, has Quasimodo rushing to save Esmeralda from a castle stronghold by leaping about dodging arrows and spears and staying one step ahead of the pursuing knight.

Finally Lothlorien, producers of war games, announced the forthcoming release of a new game tentatively entitled Time Jumper. No further details were available.

Cases and covers

A HANDY carrying case is now available for the Dragon.



Jenart's cover

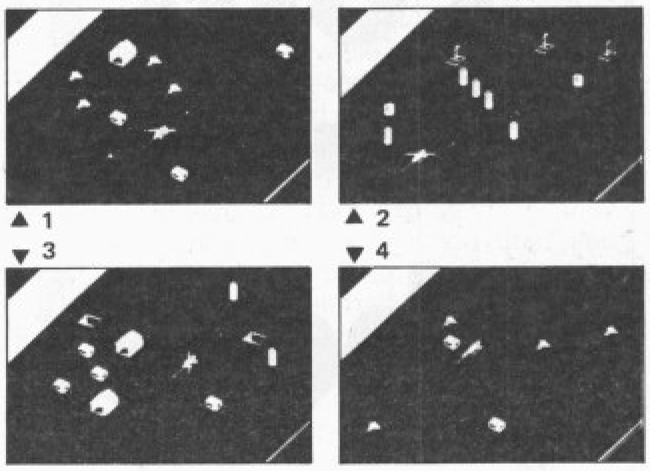
The case, constructed from heavy-duty, brown vinyl, waterproof material, was one of Dragon Data's top-selling mail order items according to Bob Artless of Jenart Design, makers of the cases. Designed to protect and carry the Dragon, transformer, plug and leads, the case will continue to be sold by Dragon Data should the company continue with the retail side of its business. At present the cases are available direct from Jenart at 19 Spire Lake, Bishops Nympton, South Molton, Devon EX36 4NY (price £12.95).

The company also produces a black nylon cover for the Dragon (price £3.20 plus 30p p&p) complete with red logo. The covers were produced to the direct specifications of Dragon Data who put in an order for 500 of them prior to going into receivership. For further details on the cases and covers contact Jenart on 07697 693.

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A joystick is required.



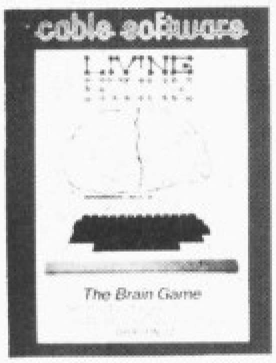


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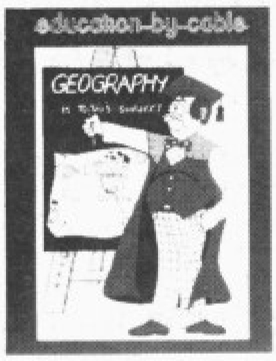
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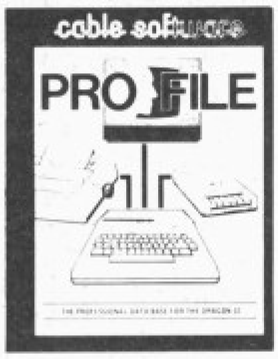
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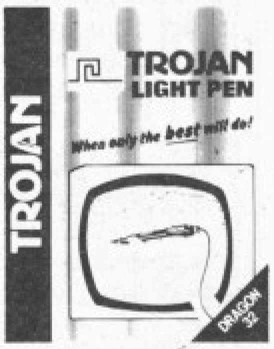
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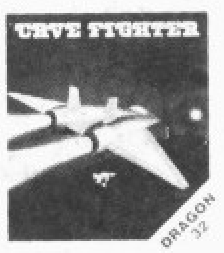
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Tom Mix's buzzards bowl out Ian Botham

Intergalactic Cheese-snufflers, terrorising pterodactyls and the evil Seiddab empire are no match for our man at the controls, ***John Scriven***

THIS MONTH I'VE concentrated on games, some from familiar names and some from fresh companies. I've also had a chat with Cuthbert, won a gold medal in the decathlon at the Olympics, bowled out Ian Botham and Kapil Dev in the same match, pushed ice blocks round the Antarctic and avoided playing Invaders — in fact, a very pleasant month.

A frequent name on the credits screen at the start of many excellent games is that of Tom Mix. Now the American company has decided it should have an English outlet, rather than licence other companies to market its programs. The first opus from this new company, **Buzzard Bait,** is up to the standard of previous titles and contains several interesting features. The most noticeable of these is probably the plastic object on the end of a cable that you find in the box next to the cassette. This strange item is a "dongle", designed to prevent piracy of the game.

Although not uncommon in the field of business software, it's the first time that I've encountered one on a piece of home software. Dongles for the Apple computer usually consist of small attachments that fit on a board inside the computer and have a selection of micro-switches that can be set to an entry code. If the dongle is absent, or the switches incorrectly set, not only will the software fail to load, it will sometimes also corrupt the disk.

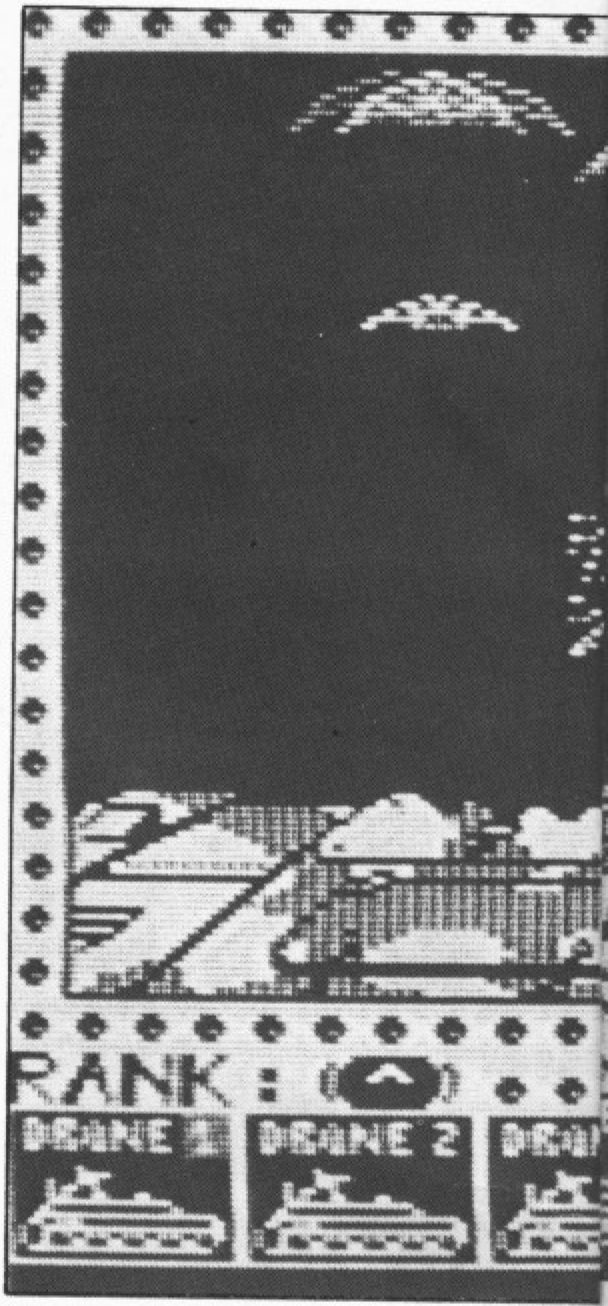
It has been calculated that millions of pounds are lost each year by software firms due to people copying each other's software. While backup copying for one's own use is perfectly legitimate, issuing your friends with odd copies is not. If the situation had stopped there, then probably program writers would have put up with it; unfortunately, there is now a thriving black market of software rip-offs, that can be seen in many market stalls round the country. What also disturbed manufacturers was the fact that so-called computer clubs had been set up solely with the aim of supplying members with cheap copies of popular games.

There is little physically that can be done to a cassette to prevent it being copied tape-to-tape, even if the program is difficult to break into. The one idea that worked well this year was snatched away by the Ministry of Defence. Some companies record the program at a very low level, but often this merely frustrates the efforts of the owners to load the original tape. If you make a copy of software that has been "dongled", then you won't be able to use it unless a dongle is attached to your machine.

Buzzard Bait's dongle consists of a small black box containing a lump of thick resin. Somewhere inside this resin lies a little board developed by a Newcastle firm. The details of the board are secret, but even if you found out what it contained, it would probably be easier to go out and buy your own copy of the game than to try and duplicate it!

Under review

Buzzard Bait £9.95 **Electron** **Crash** **Pengon** **Cuthbert in Space** £8.00 each	Microdeal, 41 Truro Road, St Austell, Cornwall
Red Meanies £7.95	Salamander, 17 Norfolk Road, Brighton, East Sussex
3D Lunattack **3D Seiddab attack** £7.95 each	Hewson Consultants, Hewson House, 56B Milton Trading Estate, Abingdon, Oxford
Sporting Decathlon £6.50	Paramount Software, 67 Bishopton Lane, Stockton-on-Tees, Cleveland
The Chocolate Factory £6.95	Minits, Strand House, Great West Road, Brentford, Middx
Tim Love's Cricket £8.95	Peaksoft, 7 Hawthorn Crescent, Burton-on-Trent



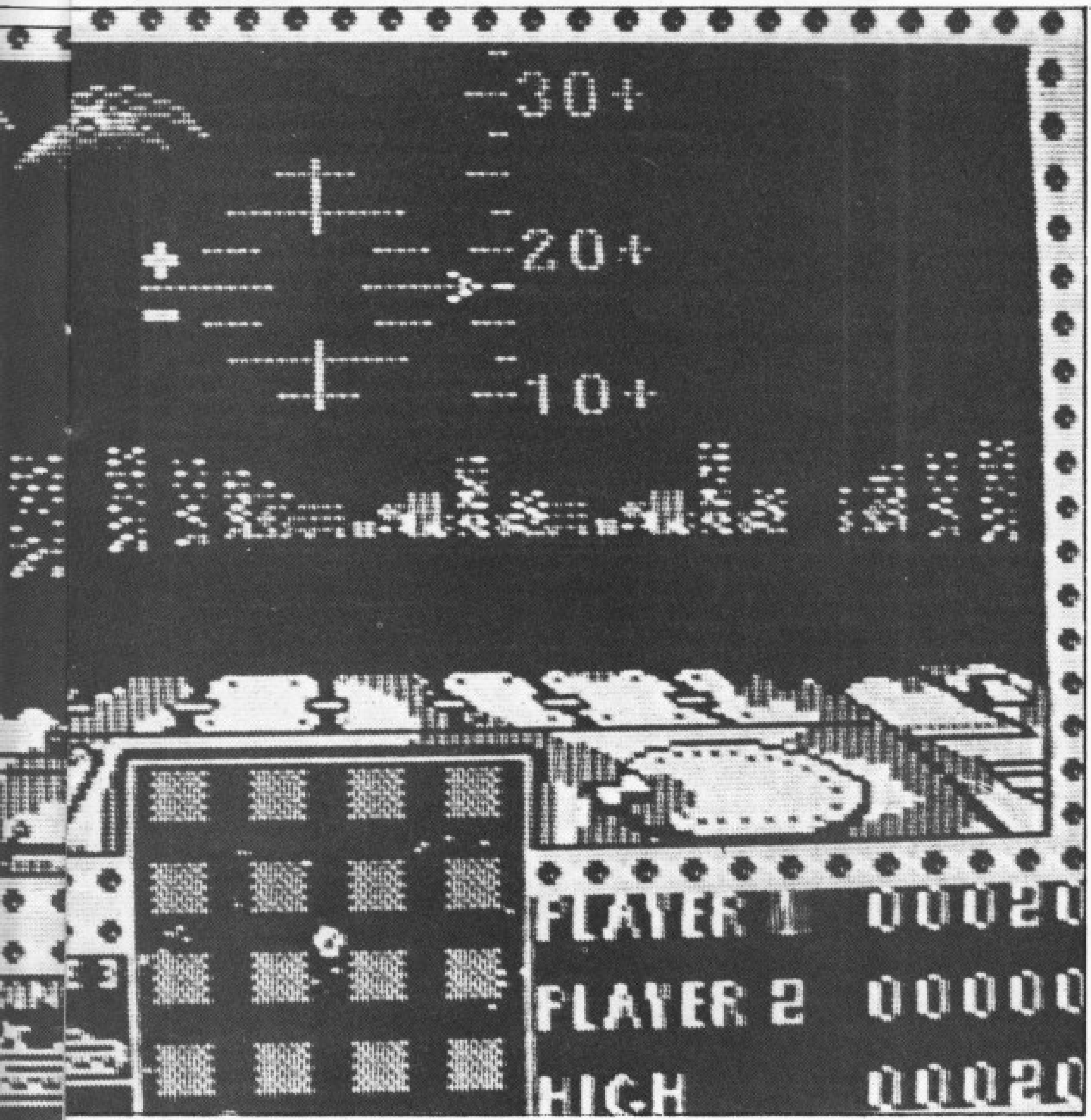
3D Seiddab Attack puts you in charge of three dron

Either way . . .

Has all this trouble been worth while? When the game has loaded and you swop the dongle for a joystick, you are offered the chance to select the background colour, and then the screen clears to reveal the playing area. This consists of several islands suspended in the air. Your player rides on the back of a bird about the size of an ostrich.

Using a joystick to control left and right movement and the fire button to flap the wings, your aim is to attack other riders on the screen. If your lance is higher than your opponent's, then they are destroyed. If you manage to get yourself killed, then you are reincarnated on one of the islands

tan



drone

tanks — watch the radar for the enemy above

(provided you still have one of your five lives remaining). When an enemy is destroyed, the rider is transformed into an egg that must also be destroyed before it hatches into a new rider. Managing to clear the screen results in a fresh wave appearing and more bits of the islands crumbling away. If you spend too long on any particular wave, pterodactyls zoom in from left and right, and they are particularly difficult to destroy. From the fourth wave onwards, the land at the bottom of the screen gives way to a lake of lava inhabited by a lava monster who will grab any bird that flies too close.

. . . it's fun to play

Although this game is great fun to play singly, it is even better with two players. Whereas most two-player games merely allow you to take it in turns, this game lets both of you appear on the screen at the same time. In this mode, each player controls a rider of a different colour, and you can pit yourselves against the enemy as a team. Indeed, you will get cooperation points if you choose to play this way.

For those readers possessing a mean nature, there's nothing to stop you jumping on your friend when he/she least expects it, although I found I often did this by mistake rather than by design (that's my excuse, anyway!). If you like the arcade game Joust, or want something different from standard space games, then you will find this good value and great fun, dongle and all.

Another game from Tom Mix is **Electron.** This could be confusing, especially if someone brings out a game called Dragon for the Electron. To show the derivation of this game, it should really be called elecTRON, as this is a competent version of the arcade game based on Disney's TRON. As such, it starts with a selection board with a dot at the centre. You can choose to move the dot in one of four directions, and this will result in one of the four games being displayed on the screen. If you fail at any game, you can reattempt it if you have lives remaining, or you can go on to the other games.

In the game Beam Buggy, you control a light cycle rushing around the screen leaving a trail and making 90 degree turns like Automan. The object is to make the computer bike cut one of the tracks while avoiding them yourself and this isn't too difficult. Prachnid is similar to Droid and other robot games where you have to avoid little creatures that fire at you. If you can avoid them you climb on board the transporter and are back on the selector board again.

Force Field puts you in a cylinder at the bottom of the screen with the roof gradually descending on your head. If you can shoot a hole through it, you can escape to freedom. The Maze consists of an area of walls containing your tank and the computer's vehicle. You have to shoot it three times to destroy it, while it only needs to hit you once, which seems rather unfair.

All the first round of games are reasonably easy to cope with, but on successive screens you have to defeat larger numbers of the enemy in each game, for instance three light cycles rather than one, and three tanks in the maze. This makes the whole program well balanced in terms of difficulty, as it is possible to improve your score each time. The graphics aren't amazing, and it's hardly based on an original idea, but it's well-written and can become quite addictive.

Salamander has produced a wide range of rather strange games in the past, from Dan Diamond's Trilogy to the Cricklewood Incident, so I was surprised when a version of Pac-man arrived this month. However, very little is ever what it appears from Brighton software houses, and the cassette of **Red Meanies** is no exception.

Meanies to Loonies

According to the accompanying blurb, you are a member of the great star-faring race of Intergalactic Cheese-snufflers who happen to be trapped in a maze of cheese. No bad fate, you might think — until you discover that the maze is inhabited by Red Meanies who rather enjoy the taste of Cheese-snufflers (that is, you). The red dots lying on the floor of the maze are ordinary cheeses, but occasionally you will find green ones that are so strong they turn the Red Meanies into Blue Loonies, who are easy to catch and eat. Unfortunately this increases the number of Red Meanies, but life never was supposed to be that simple.

The screen shows how many cheeses you have consumed and how many lives you have left, as well as a view of the maze. In this version, however, you never see the maze from the air, always from ground level. For those of you who have ever wondered how it felt to be a white rat racing through the maze alleys in some laboratory, then play this game. The graphics are very fast, and you use the keyboard to turn or go forward. The keyscan routine is also very efficient, and you can hold the forward key down at the same time as you turn left and right. I think that Phantom Slayer is still my favourite Dragon maze game, but Red Meanies is well worth considering.

Microdeal has produced several new titles this month, including some that continue themes from previous games. **Crash** is one of these, and stars Mario, from The King, who doesn't get on with gorillas quite as well as David Attenborough does. Flying across the Amazonian basin, he has been forced to parachute into the jungle and must now try to reach safety. The initial display lets you choose the background colour, and then has a rather long piece of introductory music as the titles are displayed. At this point, you are shown the four different screens until ►

DUCKWORTH HOME COMPUTING

All books written by Peter Gerrard, former editor of *Commodore Computing International,* author of two top-selling adventure games for the Commodore 64, or by Kevin Bergin. Both are regular contributors to *Personal Computer News, Which Micro? and Software Review* and *Popular Computing Weekly.*

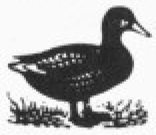
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The three games listed in this book are available on one cassette.

Other titles in the series include *Sprites & Sound on the 64, 12 Simple Electronic Projects for the VIC, Will You Still Love Me When I'm 64, Advanced Basic & Machine Code Programming on the VIC, Advanced Basic & Machine Code Programming on the 64,* as well as *Pocket Handbooks for the VIC, 64, Dragon, Spectrum* and *BBC Model B.*

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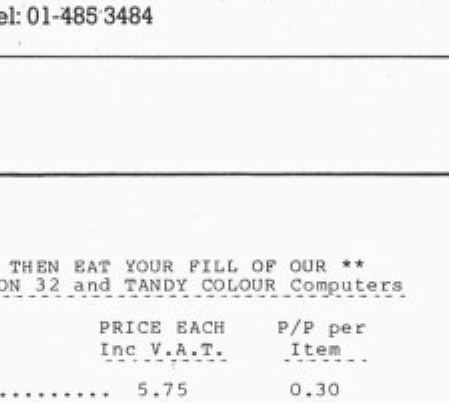
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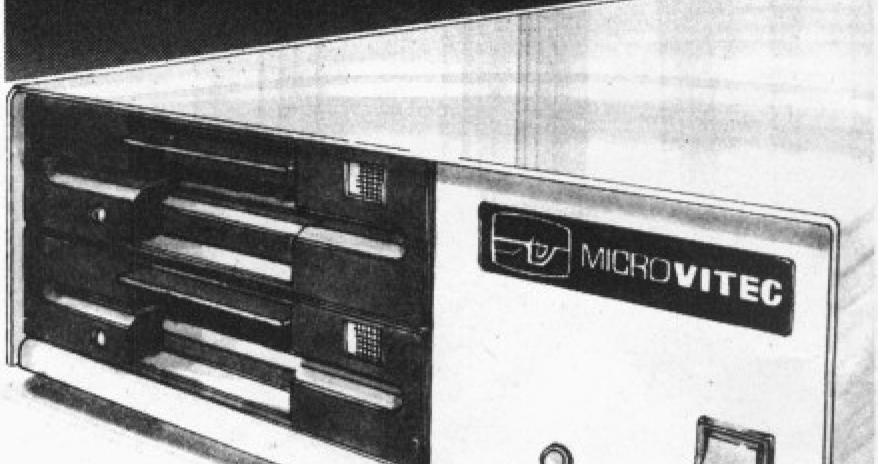


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◀ you press a key to start the game.

The first screen consists of two ladders on each side of the screen. The object is to swing across on a rope, climb a ladder, swing back, climb another ladder and so on, until you arrive at the top of the screen. On the way Mario needs to collect various objects lying on ledges before he is allowed to proceed to the next screen. Impeding his progress are spiders that drop from the roof and bounce up and down on their threads, and some nasty snails that wriggle around as they, too, descend about his ears.

Screen two has evil frogs to jump over, and screen three forces him to use his parachute again as he attempts to leap from a tall tree into a boat. Screen four introduces monkeys who must be avoided at all costs before Mario is back at the start.

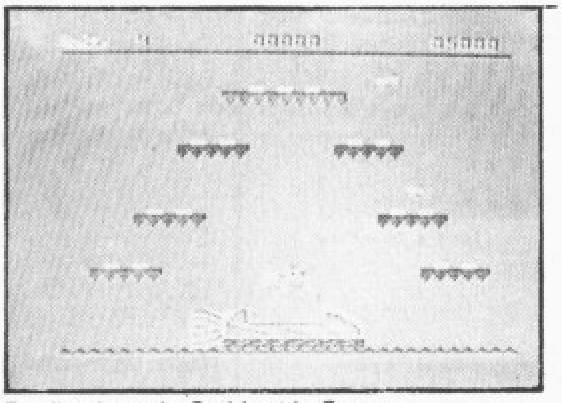
I found the spiders reasonably easy to escape, but the snails are particularly aggressive. All in all, a good game to play, and one with quite a bit of originality, though probably not as addictive as The King, Cuthbert in the Jungle, or my favourite, Dragon Data's Junior's Revenge.

Mentioning Cuthbert reminds me of an enjoyable day I had at Earls Court recently, where I actually had a conversation with Cuthbert and joined his club. Unfortunately the conversation had to be conducted via a TV screen, but was interesting none the less, and it was good to see that the lad had escaped from the clutches of the Moronians once again.

His latest exploits are recorded on **Cuthbert in Space,** which sends him right to the Moronian Solar System to plunder their planets for fuel pods. The display shows you landing on each planet in turn, and leaving the mother ship in a highly manoeuvrable scout craft. You can control the vessel round the screen to the different locations of the pods. The Moronians send out their police force to prevent you from achieving your aim but you can shoot at them, provided you are facing in the right direction.

By collecting all the fuel pods from one planet you are allowed to try to capture looted goods that descend from the top of the screen. I didn't find this as much fun to play as some of Cuthbert's earlier adventures, and I found it a difficult game to master. This is probably a point in its favour, however, as anyone buying the game would not like to spend £8 only to find there was no challenge.

A couple of months ago, I reviewed a game from Hewson Consultants called 3D Space Wars, which showed you the view from the flight deck of a space craft under attack. I was very impressed with the graphics in this game and was interested to see two other titles come my way this month, **3D Seiddab Attack** and **3D Lunattack.**



Battling it out in Cuthbert in Space

In 3D Seiddab Attack, you control three drone tanks as they trundle slowly along long canyons of buildings. All the time you are being attacked by enemy craft which swoop out of the sky at you. You are given warning of their approach on a radar screen at the bottom of the display, and you can also see the front of the tank. This is very useful, as each time you are hit, a piece of the front breaks off in an alarming fashion, and eventually the engine shuts down and the next drone takes over. If you liked 3D Wars then you'll enjoy this game, although the lumbering speed of the tank tends to be frustrating as you try to swing the nose around to fire at the enemy craft. The displays are very clear and the animation excellent. Definitely worth a look.

3D Lunattack uses the same technique to display enemy ships moving towards you, but this time you are piloting a Z5 Luna Hover Fighter attempting to penetrate three rings of defence before it can attack and destroy the Seiddab Base. This is a fairly complicated game and one that needs quite a lot of practice before the inner defence rings can be reached. The visual effect of flying over the lunar surface is very realistic, complete with a partially darkened earth hanging in the sky. There are enemy tanks and fighters to contend with, as well as a mountainous landscape to negotiate.

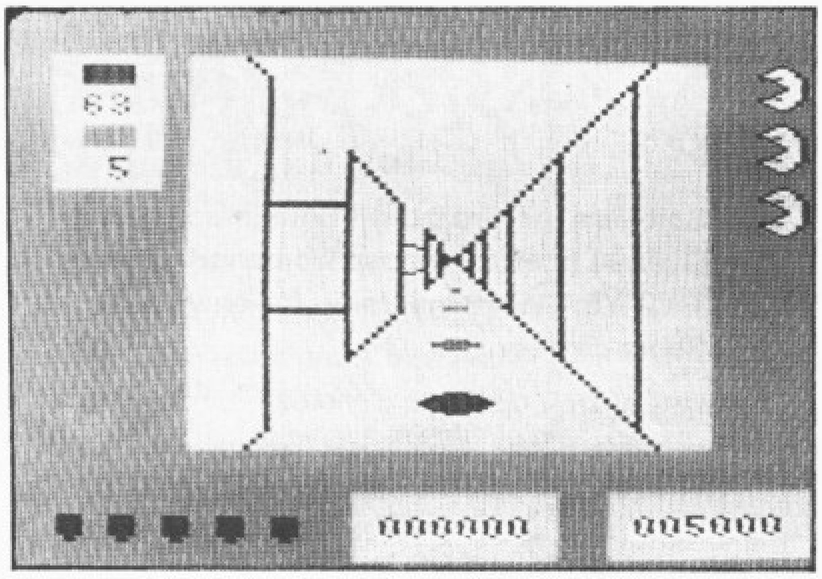
There is an instrument panel at the bottom of the screen that gives you warning of fighters approaching and the direction of the base. There are also messages that tell you if tanks are near and one curious one that must be a weather report for Yorkshire, as it keeps reading "Hull overheating" (!?).

The sound effects are quite exciting and the whole game is another success from Hewson Consultants. Although the formula has worked well so far, I'm not sure if Hewson could get away with any more 3D programs, as there is a certain amount of similarity between all three. As a final program, it could use the excellent 3D display to good effect in a re-write of its flight simulator.

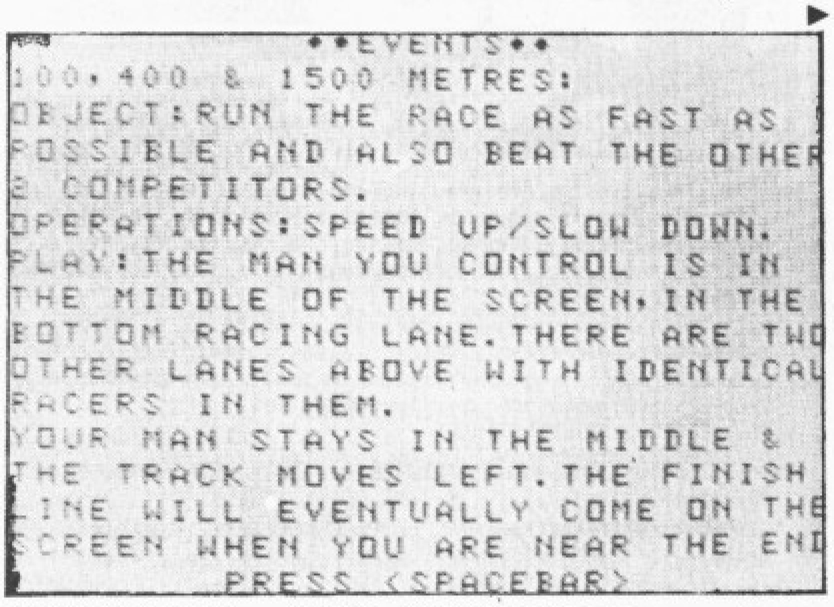
Sporting Decathlon is the title of a game from a new name in Dragon programs, Paramount Software. This game has appeared at the right time to cash in on Olympic fever this summer, but any budding Daley Thompsons would probably have more fun outdoors than playing this game. The idea is fine — 10 events in which you control a miniature athlete who fights his/her way to gold, but after a few plays, it begins to pall.

The graphics are quite good, with a little figure running from left to right across the screen, and the amount of energy available during flat races is shown as a line across the bottom of the display, as is the distance remaining. The winning technique seems to be discovering how to use up almost all your energy without actually collapsing before the finishing line. The throwing events seem to be won by luck more than by judgement — you have to try to release the joystick button while a flashing strength line is at its greatest. The jumping events are similar, though more difficult. I still haven't managed the correct technique of doing the pole-vault.

At the end you get the adulation of the crowd at the medal ceremony accompanied by the strains of the *Chariots of Fire* theme. Although I don't think this is the sort of program to have lasting appeal, it might have some attraction to those of you who ▶



Green ones turn the red ones into blue ones in Red Meanies



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"Right again."
"Are you saying I can use a joystick to make the bowler deliver an off-break pitched two feet to the bowler's left, six feet from the crease..."
"With practice, certainly."
"...hang on, I haven't finished yet. And to fool the batsman, can I make it a quicker or slower ball than usual?"
"Finished?"
"Yes...no - can I also, using the joystick, control where the bowler releases the ball and the direction in which he bowls it?"
"Finished now?"
"Yes."
"The answer's still yes - and you'll see it happen in full-bodied, animated graphics."
"What about the fielders - can I position them myself?"
"Of course"
"With the joystick?"
"Naturally."
"Well, just how realistic is it? For example, what happens if the batsman gets an edge?"
"If it's a Denis Lillee special, he might be lucky and fluke a boundary. On the other hand, he might be caught in the slips."
"You do, of course, control the batsman with the joystick."
"Of course."
"Come on - there must be a limit."
"Ask away."
"All right - can I pick my own teams, decide how skilful each batsman and bowler is, can I practise bowling, be out LBW, run out or bowled, can I hit my wicket or be caught, are there byes, no-balls and wides, does a damp wicket help the spinners, if I need a break, can I save the game..."
"Hang on, let's catch up. Yes, yes, yes, yes, yes, yes, yes, yes, yes, yes, yes, yes and yes."
"And what happens if I've no-one to play against?"
"Your Dragon will give you a game - at any of three skill levels."
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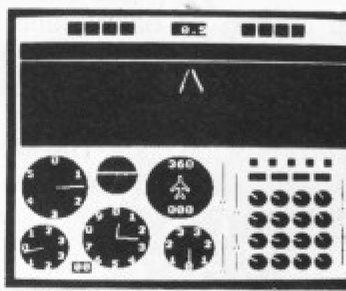
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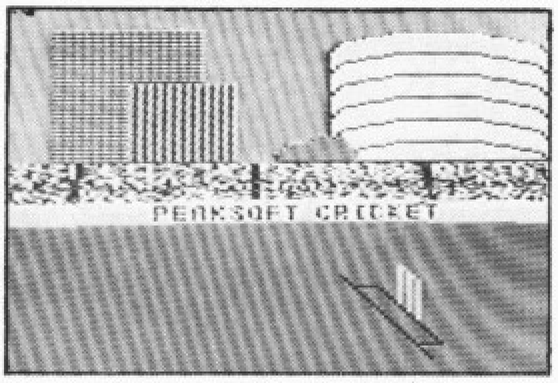
◀ prefer their exercise in front of a TV screen.

Another new company name is that of Minits, and the name of the game is **The Chocolate Factory**. From the title, you might expect a thrilling adventure game with Charlie, the Oompa-Loompas, and all the other characters from Roald Dahl's book. However, this is simply a simulation game in which from two to six players own chocolate factories and try to make their fortune. It doesn't sound very inspiring, and I'm afraid it didn't strike me as being the sort of program I'd rush out and buy. It appears to be very well written, and you can choose to have rampant inflation, strikes, heatwaves and other problems taking place just to liven up the game, but it just didn't seem to have any real excitement. I suppose if you have fantasies about being a factory owner or a millionaire, then it might appeal to you, but it's not one for me.

Cricket anyone?

Another simulation that uses far more of the Dragon's abilities is **Tim Love's Cricket** from Peaksoft. For some reason, computers and cricket both produce the same unkind remarks from some females of my acquaintance — something about their both being traditional male activities. Whereas more girls are enjoying computers nowadays, the same cannot really be said for cricket, and I imagine that you'd have to be quite keen on the game to enjoy this cassette. However, it might appeal to those who want to know more about the magical sound of leather on willow, and it does give you a very full version of the real game (the only serious omission seems to be the beer tent).

At the start there is a screen display of what looks like the Oval, complete with John Arlott's favourite view, "the gasometer sinking slowly in the distance". After this you can enter your standard: test match, county or village green. Even if you select the last category the match is between England and a World XI, although you can name your own team, and the choice of category merely changes the speed of bowling. You can play against someone else or try your best against the computer. There are many fine details in this game and you need careful control of



the joysticks to avoid no-ball calls.

There is a view from the side of the wicket as well as one from above, and the figures are very life-like. The angle of the bat, its height and the position of the batsman are all variable, as is the control of the ball when it's your turn to bowl. Immediately the batsman has hit the ball, the display changes to a bird's-eye view of the whole pitch. If you are fielding, you press the fire button until the fielder closest to the ball begins to flash, then you can control his movements as he chases the ball. This game takes a long time to perfect, but if you are interested in this noble sport, you will undoubtedly get hours of enjoyment from Peaksoft's Cricket.

Cooling down

The last cassette I have looked at is an ideal game to cool you down in the middle of summer. **Pengon** from Microdeal, is a Dragon version of the arcade game where you control a little penguin who pushes large blocks of ice around the screen. You can select the skill level from one to five and a maze of blocks appears on the display. Some creatures who go by the unlikely name of Seanasties appear and try to munch you. Your only defence is to crush creatures between the blocks by pushing them. Eventually you kill all the creatures on the screen, and it fills up with fresh blocks. There are three special blocks also on the screen that cannot be crushed, but will add 1,000 points to your score if you manage to push them together. A rather simple game, but with addictive potential.

After a month in which Dragon Data has gone under yet again, it is reassuring to see that the selection of software grows in both quality and quantity all the time, and that Dragon owners are not being neglected by the games writers. One hopes it will continue to carry on in this way. ■

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Cosmic cruiser

*Destroy the Starons in **Brian Morley's** space-age game*

HAVING several friends who own computers other than the Dragon 32, I often see game programs that appear to be beyond the graphics capabilities of my Dragon. I decided to see how far the Dragon's Basic language could be used to create an Atari-style Star Raiders game. The result was this slightly lengthy and surprisingly difficult game.

The program uses the PUT and GET commands in graphics PMODE4, and to allow reports and messages to be displayed, I have defined each character in a "draw string", which is put onto the hi-res screen using the routines in lines 1260 to 1350. The target sights are moved using the right joystick, as I found inputs from the keyboard to be unreliable.

The fire button on the joystick fires the fighters' laser weapons, which converge at a point in the centre of the sights. If a hit is detected the "Starons" ship is blown up, the screen is cleared and a new view is displayed. Altogether there are nine Starons, if all are destroyed you win, but be careful, you only have limited laser energy. I have not used the double speed POKE 65495, but this may be inserted as line 45 if desired.

Variables

A B S1 S2	Location of spaceship
SS	Spaceship array
FL FR FU FD	Ship movement limits
C D	Ship movement distances
T1 T2 T3 T4	Location of target sights
TS	Sight array
TL TR TU TD	Sight movement limits
J0 J1	Joystick values
T5 T6	Joystick direction determinants
BP P B1 B2	Fire button variables
A$	Print string
LH	Length of A$
ES	Energy for each laser shot
NS	Number of shots remaining
NT	Number of targets remaining
LT$	Letter array
NU$	Number array
K$ K	Inkey $
X	Counter
U V U$ V$	Random variables

Program notes

10-40	Copyright message
50	Dim arrays
60-90	Instructions
100-260	Set up screen
270-340	Set constants
350-530	Set difficulty
540-580	Set up display
590-750	Main loop
760-900	Fire laser routine
910-1060	Hit Staron routine
1070-1150	Out of energy routine
1160-1250	No Starons left routine
1260-1350	Draw letter + numbers
1360-1470	Update screen
1480-1510	Set up arrays
1520-1900	Data for letters and numbers

```
10 '*****************************
20 '*********DRASTAR  4**********
30 '*****BRIAN MORLEY FEB84*****
40 '*****************************
50 DIM LT$(26),NU$(9),SS(25,18),TS
(40,20)
60 CLS:PRINT:PRINTTAB(11)"DRASTAR
4":PRINT
70 PRINT"MISSION:":PRINT TAB(7)"YO
U ARE REQUIRED TO RID   THE GALAXY
 OF THE 9 REMAINING   STARONS. YOU
 ARE THE PILOT OF    A CRIPPLED DRA
STAR FIGHTER."
80 PRINT"        YOUR FIGHTERS ENGINE
S ARE   DAMAGED,SO YOU MUST ANTICI
PATE  THE STARONS FLIGHT PATH TO P
UT  THEM IN YOUR SIGHTS."
90 'SET UP SCREEN
100 PMODE4,1:COLOR 1,0:PCLS:GOSUB
1480
110 DRAW"BM0,0S6BD7BR4RE2R2UDR2F2R
LG2L4H2":PAINT(10,10)
120 GET(0,0)-(25,18),SS,G
130 PCLS:DRAW"BM0,0S8"
140 DRAW"BD2BR3R2L2D3LRD3R2"
150 DRAW"BM25,0BD2BR2R2D3RLD3L2"
160 GET(0,0)-(40,20),TS,G
170 PCLS:LINE(0,170)-(256,192),PSE
T,BF:DRAW"C0"
180 LINE(1,172)-(254,180),PSET,B:D
RAW"BM4,174"
190 A$="ENERGY":GOSUB 1260
200 LINE(41,174)-(251,178),PRESET,
BF
210 LINE(1,182)-(126,190),PRESET,B
:DRAW"BM4,184"
220 A$="STAR@DATE":GOSUB 1260
230 DRAW"BM90,184":A$="00000":GOSU
B 1310
240 LINE(128,182)-(254,190),PRESET
,B:DRAW"BM130,184"
250 A$="STARONS@REMAINING":GOSUB 1
260
260 DRAW"BM240,184":A$="09":GOSUB
1310
270 'SET CONSTANTS
280 C=5:D=4:FR=225:FL=5:FU=5:FD=14
5
290 E=4:F=4:TR=210:TL=4:TU=4:TD=14
5
300 T3=40:T4=20:T5=9:T6=54
310 S1=25:S2=18
320 B1=254:B2=126:NT=9:BP=65280
330 PRINT:PRINT:PRINTTAB(2)"HIT 'S
PACE' BAR TO CONTINUE"
340 K$=INKEY$:IF K$=" " THEN 350 E
LSE GOTO 340
350 'SET DIFFICULTY
360 CLS:PRINT TAB(6)"HOW MANY LASE
R SHOTS?":PRINT
370 PRINTTAB(11)"A.10 SHOTS":PRINT
380 PRINTTAB(11)"B.14 SHOTS"
390 PRINT:PRINTTAB(11)"C.15 SHOTS"
:PRINT
400 PRINTTAB(11)"D.21 SHOTS":PRINT
410 PRINTTAB(11)"E.30 SHOTS":PRINT
420 PRINTTAB(8)"SELECT BY LETTER"
430 K$=INKEY$:IF K$="" THEN 430
```

Continued on page 22

```
440 K=ASC(K$)-64:IF K<1 OR K>5 THE
N SOUND 100,2:GOTO 430
450 ON K GOTO 460,470,480,490,500
460 NS=10:ES=21:GOTO510
470 NS=14:ES=15:GOTO510
480 NS=15:ES=14:GOTO510
490 NS=21:ES=10:GOTO510
500 NS=30:ES=7
510 PRINT:PRINTTAB(3)"PRESS 'SPACE
 BAR TO BEGIN"
520 K$=INKEY$:IF K$=" " THEN TIMER
=0:PRINT@448,"          STAND BY
       ":GOTO 540
530 GOTO 520
540 'SET UP DISPLAY
550 LINE(0,0)-(256,169),PRESET,BF:
T1=108:T2=86
560 PUT(T1,T2)-(T1+T3,T2+T4),TS,PS
ET
570 FOR X=1 TO 10:GOSUB 1360:NEXT
580 A=RND(225):B=RND(145):SCREEN 1
,1
590 A=A+C:B=B+D
600 IF A<FL OR A>FR THEN C=-C
610 IF B<FU OR B>FD THEN D=-D
620 PUT(A,B)-(A+S1,B+S2),SS,PSET
630 P=PEEK(BP):IF P=B1 OR P=B2 THE
N GOSUB 760
640 JO=JOYSTK(0):J1=JOYSTK(1)
650 IF JO<T5 THEN T1=T1-TL
660 IF JO>T6 THEN T1=T1+TL
670 IF J1<T5 THEN T2=T2-TL
680 IF J1>T6 THEN T2=T2+TL
690 IF T1<TL THEN T1=TL
700 IF T1>TR THEN T1=TR
710 IF T2<TL THEN T2=TL
720 IF T2>TD THEN T2=TD
730 PUT(T1,T2)-(T1+T3,T2+T4),TS,PS
ET
740 U=RND(T4):IF U>S2 THEN GOSUB 1
360
750 GOTO 590
760 'FIRE LASER
770 PLAY"T255L402CBACBACBACBACBACB
A":T1=T1+20:T2=T2+10
780 FOR X=5 TO 7
790 LINE(X,169)-(T1,T2),PSET
800 LINE(256-X,169)-(T1,T2),PSET:N
EXT
810 FOR X=5 TO 7
820 LINE(X,169)-(T1,T2),PRESET
830 LINE(256-X,169)-(T1,T2),PRESET
:NEXT
840 NS=NS-1:LINE(NS*ES+41,173)-(25
3,179),PSET,BF
850 GOSUB 1400
860 PUT(A,B)-(A+S1,B+S2),SS,PSET
870 IF PPOINT(T1,T2)>0 THEN GOTO 9
10
880 IF NS=0 THEN GOTO1070
890 T1=T1-20:T2=T2-10
900 RETURN
910 'HIT STARON
920 PUT(A,B)-(A+S1,B+S2),SS,PRESET
930 PLAY"L10005GFED"
940 PUT(A,B)-(A+S1,B+S2),SS,PSET
950 PLAY"CBAO4GFED"
960 PUT(A-1,B-1)-(A+S1+1,B+S2+1),S
S,PSET
970 PLAY"CBAO3GFED"
980 PUT(A-3,B-3)-(A+S1+3,B+S2+3),S
S,PSET
990 PLAY"CBAO2GFED"
1000 PUT(A-6,B-6)-(A+S1+6,B+S2+6),
SS,PSET
1010 PLAY"CBAO1GFEDCBA"
1020 NT=NT-1:LINE(239,183)-(253,18
9),PSET,BF
1030 A$=STR$(NT):DRAW"BM240,184":G
OSUB 1310
1040 IF NT=0 THEN GOTO 1160
1050 IF NS=0 THEN GOTO 1070
1060 GOTO 540
1070 'OUT OF ENERGY
1080 LINE(0,0)-(256,169),PRESET,BF
1090 LINE(0,170)-(256,192),PSET,BF
1100 DRAW"BM2,171":A$="STAR@DATE":
GOSUB1260
1110 DRAW"BM70,171":GOSUB 1450
1120 DRAW"BM120,171":A$="YOU@RAN@O
UT@OF@ENERGY":GOSUB 1260
1130 DRAW"BM55,178":A$="THE@GALAXY
@IS@DESTORYED":GOSUB 1260
1140 PLAY"P2;O2;T2;L3;C;L4;C;O1;L8
;B;O2;L4;L4;C;L6;4;L8;D;L6;D;L8;C;
L6;C;L8;O1;B;O2;L3;C;"
1150 DRAW"BM26,185":GOTO1230
1160 'NO STARONS LEFT
1170 LINE(0,170)-(256,192),PSET,BF
1180 DRAW"BM2,172":A$="STAR@DATE":
GOSUB 1260
1190 DRAW"BM70,171":GOSUB 1450
1200 DRAW"BM13,179":A$="CONGRATULA
TIONS@YOU@SAVED@THE@GALAXY":GOSUB
1260
1210 FOR X=1 TO 2:PLAY"T15;L4;V15;
O3;A#;ADEGFBCADEFGBADE":NEXT
1220 DRAW"BM26,192":GOTO1230
1230 A$="PRESS@THE@FIRE@BUTTON@TO@
RESTART":GOSUB 1260
1240 P=PEEK(BP):IF P=B1 OR P=B2 TH
EN RUN
1250 GOTO 1240
1260 'DRAW LETTERS
1270 DRAW"S4CO"
1280 FOR X=1 TO LEN(A$)
1290 DRAW LT$(ASC(MID$(A$,X,1))-64
)+"BR3"
1300 NEXT:DRAW"C1":RETURN
1310 'DRAW NUMBERS
1320 DRAW"S4CO"
1330 FOR X=1 TO LEN(A$)
1340 DRAW NU$(VAL(MID$(A$,X,1)))+"
BR3"
1350 NEXT X:DRAW"C1":RETURN
1360 'DRAW STARS
```

```
1370 U$=STR$(RND(250)):V$=STR$(RND
(166))
1380 DRAW"BM"+U$+","+V$+"S8C1NDNLN
UR"
1390 RETURN
1400 'DRAW TIME
1410 LINE(88,183)-(124,189),PSET,B
F:DRAW"BM90,184"
1420 A$=STR$(INT(TIMER/10)):LA=LEN
(A$)
1430 A$=LEFT$("000",5-LA)+A$:GOSUB
 1310
1440 RETURN
1450 A$=STR$(INT(TIMER/10)):LA=LEN
(A$)
1460 A$=LEFT$("000",5-LA)+A$:GOSUB
 1310
1470 RETURN
1480 'SET UP ARRAYS
1490 FOR X=0 TO 26:READ LT$(X):NEX
T
1500 FOR X=0 TO 9:READ NU$(X):NEXT
1510 RETURN
1520 'DATA @ TO Z
1530 DATA BR4
1540 DATA D4RU2R3ND2U2NL3
1550 DATA D4RNU2R2U2L2R1U2NL2BR
1560 DATA D4RNUR2UBU2UL3R3
1570 DATA D4RNU2REU2HNL2BR
1580 DATA D4RNUR2BU2BLL2U2R3
1590 DATA D4RU2RBU2L2R3
1600 DATA D4R2NURU2LBU2L2R3
1610 DATA D4RU2R2D2U4
1620 DATA BDD3RU4
1630 DATA BD3DR2NURU4
1640 DATA D4U2R3D2U2L2E2
1650 DATA ND4RDBD3R2BU4
1660 DATA D4RU2BU2RND2R2D4BU4
1670 DATA D4RU1BU3LF3DU4
1680 DATA NR3D4RBU2U2BD4R2U4
1690 DATA D4RU2R2U2L3R3
1700 DATA NR3D4R2NURU4
1710 DATA NR3D4RU2R3ND2LU2NL3BR
1720 DATA NR3DNRDR3D2L3BR3BU4
1730 DATA BD4BR2NU4RUBU3L3R4
1740 DATA D4RNU2R2U4
1750 DATA ND4RD2BD2E4
1760 DATA D4RNU2RNU4R2U4
1770 DATA NDF4LBL3E4
1780 DATA D2R3D2U2LU2RND2
1790 DATA NDR4G4RNUR3BU4
1800 'DATA 0 TO 9
1810 DATA D4R4U4L3ND2R3
1820 DATA BR2D4RU2BU2BR
1830 DATA R3D2RU2D2L4D2R4BU4
1840 DATA R4D2L2RD2L3R4U4
1850 DATA D3RNU3R2NDRNDRBU3
1860 DATA NR4D2RNU2R3D2L4BR4BU4
1870 DATA ND4RD2R3D2L4BR4BU4
1880 DATA DRUR3D4LU2RU2
1890 DATA D4R4U2NL4U2L4RD2R2D2RBU4
1900 DATA R4D4LU2L3U2R4
```

Going strong with the Dragon

A Dragon newsletter and telephone hotline service are two of the hallmarks of Premier Microsystems, one of the leading Dragon firms — by ***Gordon Ross***

SLEEPY, SOUTH NORWOOD in suburban London is perhaps an unusual location to head for in search of one of the leading developers of Dragon associated products.

Nevertheless, this is the home of Premier Microsystems, producers of the first disk system for the Dragon 32 and "intrepid inventors" of a whole host of Dragon compatible software, utilities and peripherals.

The company developed from its embryonic form as Premier Publications, a firm set up by John Peel (a leading luminary in Valhalla, one of the most popular adventure fantasies for the Spectrum and Commodore) to produce cassettes to run on the Casio 502P programmable calculator. He was joined by Janet and John Hooker (two of the current five directors) who helped with the diversification of material for the UK101 Superboard and the Tandy.

Starting up

Mike Bedford, now managing director of Premier, first became involved with the company after buying one of its tapes. He was joined by wife Sandra and together the Hookers and the Bedfords bought out John Peel. Operating from their homes, they continued with the mail order business of Premier Publications. Peter Rihan, the fifth director of the company and now chairman, actually started by producing toolkits for Premier, but, as Mike Bedford put it, "it became too expensive paying him royalties" and he was asked to join the company.

In March last year the five partners became directors (Peter, Mike, Sandra and Janet are full-time directors and John works part-time) and Premier Microsystems came into being.

The company, from its humble beginnings, has mushroomed and the "development is far greater than we ever thought would happen" says Janet Hooker. This is predominantly due to Premier's association with the Dragon and the success of its Dragon compatible disk drive system.

Janet, who has not exactly followed a traditional career structure to her present position (her first jobs were as a nurse and then a health visitor) was the first of the "famous five" to become involved in Premier. She helped John Peel with the mail order side of his business and after he left, decided to stay on with the intention of diversifying and selling as many packages for a computer as had been sold for calculators.

Finding the right computer was of paramount importance. The Dragon was chosen because it was regarded at the time as the best value-for-money computer available. Here Mike Bedford takes over the story. Mike, an engineer and one time employee of computer giant IBM, says "we were looking around for a micro to put the same amount of effort into as we had for the 101 Superboard type of machine."

Ideally, Premier was after a machine for people who like "dabbling", the Dragon with its proper keyboard was a potential small business machine and it was felt that there would be a market to supply kits. Also, the Dragon's microprocessor was ideally suited to their background — having already developed the RomDos and Vortex disk systems for the UK101, switching to the Dragon would not be such a problem.

Premier's Delta disk drive system was first publicly displayed at a horticulture demonstration in January 1983. In March the single density disk drive was first sold to the public and eventually sales were taken over by Cumana (thought to be Europe's largest independent disk manufacturer and distributor). The disk system was also converted to double density and now retails for £284.35 (for this you receive the 40-track 108K of storage disk drive, a controller, manual, disk and cables).

The Delta disk drive system has had good reviews and now costs £9 more than its rival, the DragonDos system from Dragon Data (for a comparison of the two systems see *Dragon User*, November).

An obviously very proud Mike Bedford did lament the fact that Dragon Data "didn't talk about a compatible Dos" and decided to produce a competitive product rather than simply adopt the Delta system.



Home for Premier Microsystems

Asked if Premier had any regrets in associating with the Dragon, the answer was a categorical "no". Although, as they said, there were now better machines available (and with higher sales figures) the Dragon 32 is a good machine and has great potential. They *were* disappointed though when Dragon Data upgraded the 32 to the 64. Mike criticised the "quality of the display" saying "the colour was disappointing and the big drawback was the omission of lower case characters." He would have preferred an 80 column display and said the 32 character display was "a retrograde step."

On relations with Dragon Data itself, Mike commented that they had an "odd relationship" but that it was as good as anyone's. "We sell our products on Dragon Data's recommendation, but, at first, we were regarded with suspicion because we knew more about the Dragon than Dragon Data did in terms of hardware and technical knowledge." Peter Rihan added that this situation had changed, and prior to Dragon Data's present problems, its servicing side had greatly improved.

Future features

Questioned about Premier's future plans, Peter said that the "company is consolidating on what we've got but are considering new products such as the Sony micro-drive" (see *Dragon User* May). He also added that for the foreseeable future Premier would continue to offer a service to Dragon owners despite the uncertain nature of Dragon Data's future. There were also mutterings about supporting the new products from GEC Dragon, though Premier remained non-commital.

Premier's present productions for the Dragon include the aforementioned Delta disk drive system; Encoder 09 — a full 6809 Assembler/Disassembler/Monitor; a sprite graphics board; Doodle-master; a Toolkit; 60 software packages; and the Flex single-task operating system which Premier regards as superior to Dragon Data's OS-9 system. Although OS-9 is a multi-task system, Premier argues that there is not a great deal you can do on the Dragon with multi-tasking due to the Dragon's memory restrictions. (For a review of the OS-9 system see *Dragon User*, April. For a review of Flex readers will have to wait for the time being.)

The company's expertise lies in machine-code programming and hardware. "The core of expertise is reflected in the main products we have," says Mike Bedford. The company is moving away from game software towards utilities. They are also moving away from cassette based software, and most of Premier's serious products are contained on disk or EPROM cartridges (erasable, programmable, read only memory).

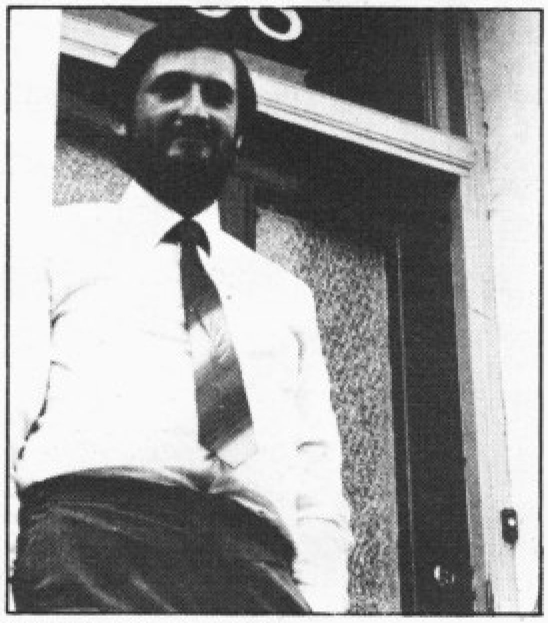
Peter Rihan tied this in to the problems of piracy, and all four directors launched into a vehement denunciation of pirateers.

"Piracy is one of our biggest headaches," said Sandra, and husband Mike added: "If piracy continues people will quite simply stop producing quality software." He read in one journal that, on average, a tape is copied seven times. This he reckons to be a conservative estimate given the extreme simplicity of copying a tape.

Not so easy, is pirating material on disk or cartridge, and added Mike, "all our products in which we have a security interest are serial numbered to prevent piracy." By this means, printed material can be traced back to the culprit and on occasion Premier has resorted to legal action. Usually the threat of a writ or legal injunction is enough to prevent further piracy, but Premier has no qualms about going all the way to the courts if necessary.

A large part of Premier's success is owed to their loyal staff, most of whom, like Mike Bedford, joined the company after having purchased products from them. As Sandra put it: "First they were our customers, then they helped in their free time and finally they worked full time."

This initial interest and involvement with computers means that the staff are only too glad to work unusual hours if necessary. "Everyone mucks in together and the only demarcation problems we have are over emptying the bins and bringing in the milk," said a joking Mike Bedford. Indeed, the directors are very proud of their employees and of the company's obvious success formula. One sign of that success is the increasing number of manufacturers who are approaching Premier direct in order to develop their products. The Sony micro-drives are an indication of this. Premier is being seen increasingly as a development company, and rather than seeking out manufacturers to develop products, the reverse is happening.



A beaming Peter Rihan

Being in the forefront of an expanding industry is not an easy task. "As the company grows there is a great deal of excitement about new products," says Mike, "but as we get bigger more time is spent on developing and marketing our products, and innovation has become harder as the industry and users develop expertise."

There are obviously a number of pitfalls to be wary of, but the company was releasing no details to potential rivals. "I'm playing coy," said Mike, merely stating that "avoiding action is part of our management expertise."

One reason for Premier's success is its after sales service and comprehensive customer records. The mail order side of its business stretches from Greenland in the north to New Zealand in the south and from Canada in the west to Hong Kong in the east. In Britain its products are available by direct order or through retail shops.

Part of its after sales service includes a regular news letter for Dragon customers (provided a purchase has been made within the past three months, though Premier did mention that by sending a SAE other interested parties could gain a copy) and a telephone hotline service.

Between 7 and 9 o'clock on a Monday evening, a programmer and engineer are available to answer questions. Although this service is primarily aimed at existing or potential customers, anyone who has a Dragon associated problem can ring Premier on 01-659 7131.

The service began through Premier's links with the Dragon. "As we were in at the beginning people didn't know how to program" so we began this service to help them, mentioned Peter — and judging by the number of perplexed Dragon users who ring this office with a whole range of problems, this service is well worth continuing. Indeed Mike Bedford added, tongue in cheek, "if there is anything Dragon Data wants to know about the Dragon, they can come and ask us."■

Selective scanning

***David Berry** comes up with a key-scan routine that is called from machine code and detects continuously pressed keys*

MOST DRAGON owners will, by now, know at least two ways of inputting data without using the classical Input or Inkey functions. Location 135 (for anyone who does not know) contains the code of the last key pressed. The other widely published scanning method examines the contents of locations 338 to 345 (dec). A little experimentation will allow you to build up a table of keynames against locations (best plotted down the left of the table) and location contents (across the top). If you get stuck this method is described in many of the Dragon books on the market at the moment (for example: *Enter the Dragon* by Colin Carter).

The first method above is not much more useful than Inkey$. The latter method, however, does provide continual scanning so that you do not have to keep re-pressing a key to read it again, as you do with inkey. However, there are still two problems: first, if two keys are pressed at once the values returned for each key are changed; secondly, this method cannot be used by machine code routines.

Routines

Languishing in the Dragons' ROM is a routine whose address is stored at A000h. An indirect JSR (ADh 9Fh A0h 00h) will return the AscII code of the key pressed. However, this routine is like Inkey with its one read per keypress. To counter these drawbacks I needed a routine which could be called from machine code, would detect continuously pressed keys and could identify correctly more than one key pressed at a time. Thus Key-Scan was born.

As written, Key-Scan occupies addresses 7000h to 70BAh. 7000h and 7001h are used as counters, then from 7002h to 7041h is the keyboard image. This image reproduces an eight row by eight column keyboard matrix. Key-Scan first clears the image to zero then sets each byte corresponding to a depressed key equal to one. Subsequent routines, whether machine code or Basic, can then examine the image as if the keyboard were memory mapped.

It is worth asking the hardware designers, in passing, why we cannot have memory mapped keyboards? After all memory is cheap these days, and if the mapping were bit-wise rather than byte-wise, as here, eight bytes would map sixty-four keys. ▶

```
DIS-ASSEMBLY OF MACHINE CODE ROUTINE.

$ 7042   NOP                  *12
$ 7043   NOP                  *12
$ 7044   NOP                  *12
$ 7045   NOP                  *12
$ 7046   LDX       x FF00     *8E FF 00
$ 7049   PSHS      £ 10       *34 10
$ 704B   LDX       x FF02     *8E FF 02
$ 704E   PSHS      £ 10       *34 10
$ 7050   LDX       £ 7002     *8E 70 02
$ 7053   LDA       £ 3F       *86 3F
$ 7055   NOP                  *12
$ 7056   CLR       i A,X      *6F 86
$ 7058   DECA                 *4A
$ 7059   BPL       * -6       *2A FA
$ 705B   NOP                  *12
$ 705C   CLR       x FF00     *7F FF 00
$ 705F   CLR       x FF01     *7F FF 01
$ 7062   CLR       x FF03     *7F FF 03
$ 7065   LDA       £ FF       *86 FF
$ 7067   STA       x FF02     *B7 FF 02
$ 706A   LDA       £ 04       *86 04
$ 706C   STA       x FF01     *B7 FF 01
$ 706F   STA       x FF03     *B7 FF 03
$ 7072   LDA       £ 08       *86 08
$ 7074   STA       x 7000     *B7 70 00
$ 7077   STA       x 7001     *B7 70 01
$ 707A   LDA       £ FE       *86 FE
$ 707C   STA       x FF02     *B7 FF 02
$ 707F   LDB       £ FF       *C6 FF
$ 7081   NOP                  *12
$ 7082   LDA       x FF00     *B6 FF 00
$ 7085   NOP                  *12
$ 7086   INCB                 *5C
$ 7087   NOP                  *12
$ 7088   NOP                  *12
$ 7089   NOP                  *12
$ 708A   NOP                  *12
$ 708B   LSRA                 *44
$ 708C   BLO/BCS   * +6       *25 06
$ 708E   INC       i B,X      *6C 85
$ 7090   NOP                  *12
$ 7091   NOP                  *12
$ 7092   NOP                  *12
$ 7093   NOP                  *12
```

Continued on page 29



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```
$ 7094    NOP              *12
$ 7095    DEC    x 7001    *7A 70 01
$ 7098    BNE    * -15     *26 EB
$ 709A    DEC    x 7000    *7A 70 00
$ 709D    BEQ    * +10     *27 10
$ 709F    ORCC   £ 01      *1A 01
$ 70A1    ROL    x FF02    *79 FF 02
$ 70A4    LDA    £ 08      *86 08
$ 70A6    STA    x 7001    *B7 70 01
$ 70A9    BRA    * -2A     *20 D6
$ 70AB    NOP              *12
$ 70AC    NOP              *12
$ 70AD    NOP              *12
$ 70AE    NOP              *12
$ 70AF    NOP              *12
$ 70B0    PULS   £ 10      *35 10
$ 70B2    STX    x FF02    *BF FF 02
$ 70B5    PULS   £ 10      *35 10
$ 70B7    STX    x FF00    *BF FF 00
$ 70BA    RTS              *39
END OF RUN
```

```
10 CLS0
20 CLEAR 1000,&H6FFF
30 DIM A$(8,8)
40 FOR I=&H7002 TO &H7041
50 POKE I,&H5F
60 NEXT
70 PRINT @32,"";
80 EXEC &H7042
90 I=0
100 FOR Q=0 TO 7
110 FOR R=0 TO 7
120 A$(Q,R)=HEX$
   (PEEK(&H7002+I))+" "
130 I=I+1
140 NEXT R,Q
150 FOR Q=0 TO 7
160 FOR R=0 TO 7
170 PRINT A$(R,Q);
180 NEXT
190 PRINT
200 NEXT
210 GOTO 70
```

Listing of test program

00	08	10	18	20	28	30	38
0	1	2	3	4	5	6	7
01	09	11	19	21	29	31	39
8	9	:	;	,	-	.	/
02	0A	12	1A	22	2A	32	3A
@	A	B	C	D	E	F	G
03	0B	13	1B	23	2B	33	3B
H	I	J	K	L	M	N	O
04	0C	14	1C	24	2C	34	3C
P	Q	R	S	T	U	V	W
05	0D	15	1D	25	2D	35	3D
X	Y	Z	uP	dn	lf	rt	sP
06	0E	16	1E	26	2E	36	3E
cr	cl	..	..	..	..	..	sf
07	0F	17	1F	27	2F	37	3F
..	..	..	..	..	..	..	..

uP = uP arrow
dn = down arrow
lf = left arrow
rt = right arrow
sP = sPace
cr = enter
cl = clear
sf = shift
.. = not used

Table 1 key codes (address offsets) codes shown above keyname

◄The Dragon keyboard is hard wired to the two ports of the 6821 PIA located at FF20h. Key-Scan initialises the PIA such that one port is an output and the other an input in a cross matrix configuration. The keyboard is then read by grounding individual matrix rows then scanning the columns to look for grounded lines. Each line — row or column — is equivalent to one bit passing over the port.

Table 1 gives the code number associated with each key. To determine whether a particular key has been pressed examine location 7002h+CODE. If the key is pressed the location will contain one, else zero. For example: location 700Bh contains one thus the "9" key is being pressed. (7002h + 09 = 700Bh).

Phantom keypresses

Seemingly, because of the way the keyboard is wired, it is possible to have phantom keypresses. If two rows are grounded and then another key is pressed on one of the grounded rows this will also appear as a keypress on the other grounded row. Listing two is a program which draws the keyboard matrix and displays the state of the image. If you play with this routine you will soon discover which sequences give rise to phantoms, and why.

You can relocate Key-Scan by changing all the 7000h series addresses, and you can leave all the NOPs out provided you recalculate all the relative jumps. Without too much trouble you could also use PCR addressing to give yourself a useful routine for inclusion in any number of your machine code programs.■

```
HEX DUMP INCLUDING KEYBOARD IMAGE.
$ 7000   DATA   ======   *00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$ 7010   DATA   ======   *00 00 00 00 00 00 00 00 00 00 0F 00 00 00 00 00
$ 7020   DATA   ======   *00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$ 7030   DATA   ======   *00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
$ 7040   DATA   ======   *00 5F 12 12 12 12 8E FF 00 34 10 8E FF 02 34 10
$ 7050   DATA   ======   *8E 70 02 86 3F 12 6F 86 4A 2A FA 12 7F FF 00 7F
$ 7060   DATA   ======   *FF 01 7F FF 03 86 FF B7 FF 02 86 04 B7 FF 01 B7
$ 7070   DATA   ======   *FF 03 86 06 B7 70 00 B7 70 01 86 FE B7 FF 02 C6
$ 7080   DATA   ======   *FF 12 86 FF 00 12 5C 12 12 12 12 44 25 06 6C 85
$ 7090   DATA   ======   *12 12 12 12 12 7A 70 01 26 EB 7A 70 00 27 10 1A
$ 70A0   DATA   ======   *01 79 FF 02 86 08 B7 70 01 20 D6 12 12 12 12 12
$ 70B0   DATA   ======   *35 10 BF FF 02 35 10 BF FF 00 39 00 FF 00 FF 00
END OF DATA RUN
```

Eradicating IO errors

*IO Errors are the bane of all Dragon users — **D L Jones** looks at a variety of situations where they are most likely to occur and shows how to prevent them*

HOW MANY times do you pull at your hair after waiting for a long load to complete, only to be faced with the dreaded IO ERROR? The reason for this frustrating episode is simple and there is no need to suffer from it.

It occurs because the Dragon does a check on the information as it is being loaded and if it finds one error it stops the load and displays that annoying message. Simple causes of this failure are: starting to load in the middle of a program and wrong playback volume.

Solve the former by always fully rewinding tapes before loading or, if you have more than one program recorded on a tape, use the AUDIO ON feature to locate the gap between programs.

The problem of playback volume can be solved by experiment. Use a professional recorded cassette (for example one of the Dragon games) and try to load it at high playback volume. You may well get an IO ERROR, so reduce the volume, reset, rewind the tape and start again.

Select a point

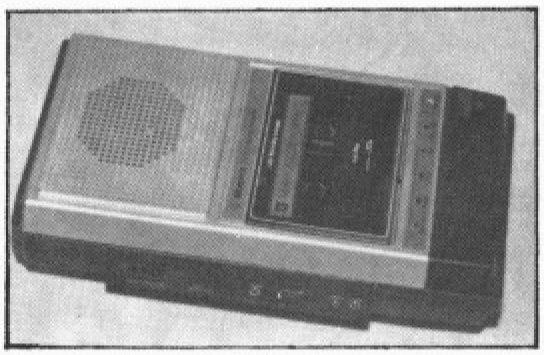
Eventually you will find a point at which the program loads, mark the volume control of the cassette recorder. Now continue to reduce the volume and repeat the loading procedure until you either get IO ERRORs again or the program doesn't load at all. Mark this point on the cassette volume control. Now, select a point midway between the two points you have marked and paint a nice white line on the volume control. This will set the correct playback level and ensure that it doesn't get lost again.

Now what about saving programs? The trouble here is that most cassette recorders sold as: "Suitable for use with the Dragon", aren't. Dragon Data recommends that recorders with an "Aux" connection are preferred, but, many of the so called suitable machines have a "Mic" input only. At first we might think that if the recorder has automatic record level control that all our problems are over — they aren't.

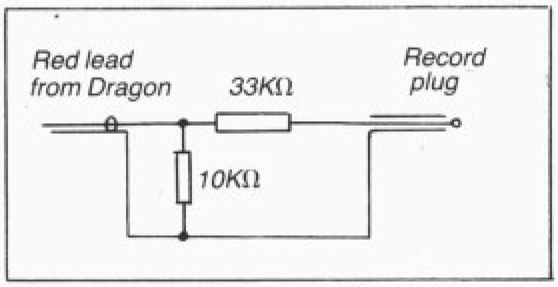
What happens is that if you do not use an "Aux" input to the recorder then the Dragon output is too high and the automatic level control has to work hard to reduce the gain of the record channel in order to correct the excess. This takes time and it is thus possible for the first few bytes of data being saved to be so distorted as to be unrecognisable on playback.

There are two ways out of this dilemma. Either or perhaps both should be used to solve the problem. First, reduce the gain of the record channel with an attenuator. I fitted mine inside the recorder, but with the benefit of hindsight it would be better to fit it inside the record plug.

About 4:1 was found to be suitable and, since the input of my recorder had an impedance of 10k, series value of 33k will achieve this (see figure one). I also placed a 10k resistor across the input to ensure that the impedance "seen" by the Dragon remained unchanged.



The recorder can be altered . . .



. . . to solve your IO dilemma, figure 1

The second solution involved some programming. Since it is always a good plan to make regular saves of a program as it is being entered (just in case the power fails as you are typing in line 900 and you have to start again) I like to include the following as the first two lines of my program:

```
 5 GOTO 15
10 MOTOR ON:SOUND 1,10:CSAVE
   "name":SOUND 1,1:STOP
15 First line of your program
```

Note that "name" = name of your program. When the program is run normally, line 5 will cause a jump over line 10. However, when you wish to CSAVE the program, or the part so far entered, simply set the cassette recorder to record and type GOTO 10 in direct mode.

The line will then be executed and will first switch on the recorder and record a low note (which will be also heard in the speaker). It will then record the program followed by "bleep" and will then halt due to the STOP at the end of the line. The low tone is ignored on playback but serves to get the automatic level control settled before the wanted data starts arriving at the cassette port.

I have found that the combination of all of the foregoing completely eliminated any errors except those caused by starting in the middle of a program and the fix for that is obvious.

Loading data

However, there still remained one problem. Although I could now reliably load programs, I still had trouble with loading data from the cassette recorder into a program. When data is saved it is often done as an array outputted to the cassette recorder in a FOR NEXT loop.

I found that if all of the data was contained in one array, then the data save was one continuous process. However, where more than one variable was saved, the recorder control would switch off the tape transport motor momentarily each time the variable changed. This resulted in a series of bursts of data with about 0.5 second breaks between them. Why then did this upset the cassette recorder? I though 0.5 second breaks were too short to upset the automatic level control, or are they?

The solution turned out to be one more area in which "suitable" recorders fail to meet the grade. To save battery power when the recorder is used for non-computer recording with remote control, the remote switch not only cuts power to the tape transport motor, but to the electronics as well. Whilst this action causes no problem at all for ordinary audio work, it spells disaster when the recorder is used for data.

The 0.5 second breaks during the save sequence give rise to monumental "hiccups" in the data stream to which the Dragon responds with that all too familiar message. The remedy is to alter the circuit of the recorder so that the electronics remains "live" all the time irrespective of

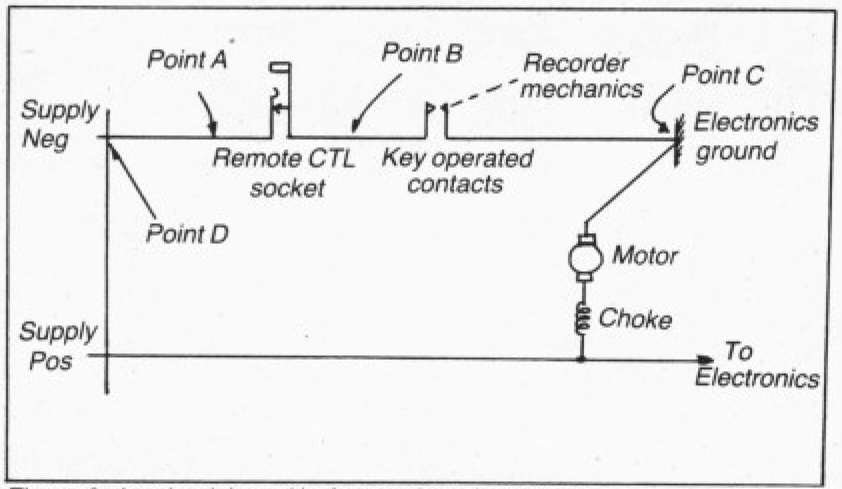


Figure 2: the circuit board before undergoing surgery

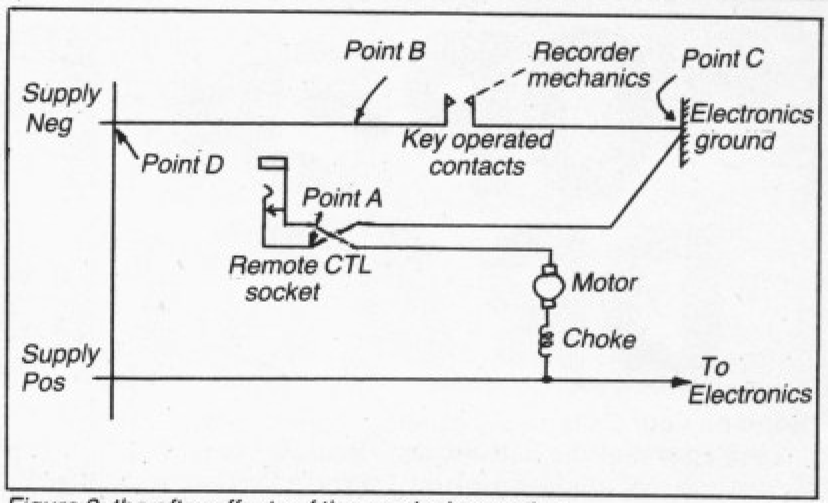


Figure 3: the after-effects of the surgical operation

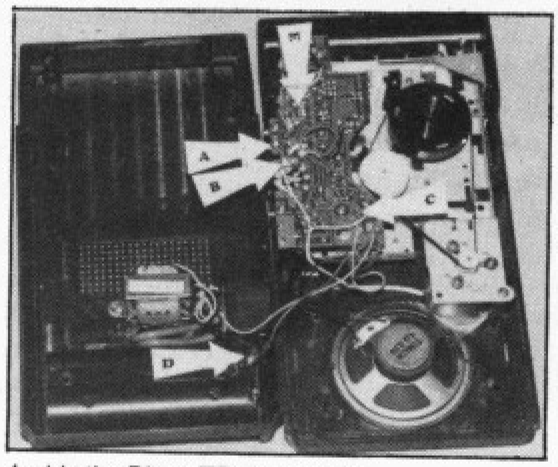
the remote control and the latter controls the transport motor only.

Unfortunately, this involved some surgery inside the recorder and if you have any doubts at all I suggest that you enlist the services of your local friendly tv repair man. I list below the modification to my Dixon TR12 recorder. If yours is different, perhaps it will serve as a guide, although the layout may be different.

Figure two shows the circuit before surgery whilst figure three shows the circuit afterwards.

Refer to the photograph of the recorder's insides. Disconnent the lead from point B and reconnect it to point D. Remove the original lead from point D. This permanently connects power supply negative to the control switch, missing out the remote control socket.

The white lead (negative end of the motor) is moved from point C to point B, thus removing it from the negative end of the electronics and connecting it to one end of the remote control socket.



Inside the Dixon TR12 recorder

The red lead which became spare in operation one above is now used to connect point C to point A, thereby connecting the electronics negative to the other side of the remote control socket.

You should now find that whilst the remote control will control the tape transport motor, the record/replay electronics is only controlled by the control buttons on the recorder.

We have thus seen that problems in CSAVEing programs and data stem mainly from shortcomings of so called "suitable" cassette recorders. In some cases, where a continuous CSAVE or CLOAD is involved, the problem can be overcome by software and/or simple external circuit changes. However, for the utmost reliability it is necessary to resort to simple modifications to the cassette recorder to separate the motor and electronics switching at the remote control socket.■

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Send us your Dragon programs, beginning with a general description and then explaining how the program is constructed. Take care that the listings are all bug-free, enclosing a cassette and, if possible, a printout. We pay £6 for each bug-free program published, double for the program of the month. If you have any problems with the listings, please send your queries to the appropriate author, *Dragon User,* 12-13 Little Newport Street, London WC2R 3LD.

Caterpillar

From J Lomax in Windsor

THE OBJECT of this game is simple. Using the "AT" and "Q" keys you must guide your caterpillar through the fields avoiding the killer pellets. In the second stage, having successfully negotiated your way through the fields, you have to travel under the road.

The main reason for writing the program was to demonstrate the Dragon's scrolling ability. The speed-up POKE can be used on the routine but may crash the program.

Program notes

10-120	Sets up screen and enters machine code.
130-140	Scans keyboard.
150	Increases score.
160-190	Checks to make sure that you do not go off the screen or hit anything.
200-220	Draws new position and executes machine code.
230	Checks to see if you are on stage one or two.
240-290	Stage one.
300-380	Stage two.
390-420	Ends game and checks for new one.

Variables

X	Your position
Y	Your level
SC	Your score

```
10 REM*******J.LOMAX*******
20 CLSO:PRINT@75,"CATERPILLER";
30 DATAFC,67,40,10,BE,67,42,FE,67,
44,4C,AE,A1,AF,C1,5A,26,F9,4A,26,F
6,39
40 FOR V=&H6700 TO &H6715:READY$:P
OKE V,VAL("&H"+Y$):NEXTV
50 DATA02,F0,06,10,06,00,
60 FORN=&H6740 TO &H6745:READA$:PO
KEN,VAL("&H"+A$):NEXTN
70 FORT=100TO1STEP-5:SOUNDT*2,1:NE
XT
80 PMODE0,1:SCREEN1,0:PCLS1
90 X=120:B=150:A=240:SC=5:P=1:Q=10
0:Z=10:M=10
100 LINE(2,190)-(10,185),PRESET,BF
110 LINE(253,190)-(245,185),PRESET
,BF
120 CIRCLE(X,80),11,0,.5
130 IFPEEK(338)=251THENPAINT(X,80)
,0,0:X=X+10
140 IFPEEK(339)=239THEN PAINT(X,80
),0,0:X=X-10
150 SC=SC+1
160 IFX<10 THENX=10
170 IFX>240THENX=240
180 IFPPOINT(X,95)=0THEN390
190 IF PPOINT(X+1,90)=0 THEN390
200 PAINT(X,80),0,0
210 CIRCLE(X,90),10,0,.5:
220 FORT=1TO5:EXEC&H6700:NEXT
230 IF P<>1THEN300
240 PLAY"T250O1EDCCDE"
250 W=RND(28)*8+8
260 CIRCLE(W,175),10,0
270 PAINT(W,178),0,0
280 IFSC=Q THENP=2:Q=Q*2:LINE(10,1
90)-(245,180),PRESET,BF
290 GOTO130
300 LINE(0,190)-(255,185),PRESET,B
F
310 W=RND(2):IFW=1THENB=-M ELSE B=
M
320 IFA<50 THENA=50 ELSE IFA>220TH
ENA=220
330 A=A+B
340 CIRCLE(A,185),Z+8
350 PAINT(A,185),1,1
360 SC=SC+1:IFSC=Q THENP=1:Q=Q*2:L
INE(10,190)-(245,180),PSET,BF:M=M+
2:Z=Z-2:A=RND(230)+10:IFZ=12THENZ=
20:
370 PLAY"T200V8O4CCO2DGE"
380 GOTO130
390 PLAY"T200L4V31GGL8GGL4B-AAGGF+
G"
400 FORT=1TO5:X$="T200O1L2V31CCDDC
CECCDD":PLAYX$:SCREEN1,0:PLAYX$:SC
REEN1,1:NEXT
410 CLSO:PRINT@128,"you traveled"
+STR$(INT(SC/10))+" miles  homewar
d";:PRINT@202,"NEW GAME";
420 SCREEN0,1:IF INKEY$="N" THENCL
S: END ELSE IF INKEY$<>"Y"THEN420
ELSE80
```

Converter

From James Greenall in Hertfordshire

CONVERTER IS a program for the conversion of numbers between decimal, hexadecimal and binary and is directed mainly at machine code programmers. It may, however, also be adapted for educational use in respect of binary and hex numbers.

On running, the headings (see line 20)

are displayed at the top of the screen and the input prompt (?) appears on the left side of the screen. Any number can then be entered, either decimal, hex or binary, followed by a digit to indicate its base (D, H or B). After a short pause the corresponding numbers will be displayed in their various columns.

Variables

Eight variables are utilised in the program and their uses are as follows:

B	A numeric array, each element representing one bit of the current binary number.
D	The value of the current decimal number.
N	A counter to control the display of lines on the screen.
X	A general purpose counter used in FOR ... NEXT loops.
Y	Temporary store during the decimal/binary conversion.
A$	Store for the initial entry.
B$	The binary value of the current number.
H$	The hex value of the current number.

Program notes

Lines	
10-80	Initialise the variables, display the heading and accept and check the input transferring control to the appropriate section of the program.
1000-1060	Check the validity of a decimal entry, convert to Hex using the Hex$ function and call the subroutines to convert to binary and display the results.
1100-1200	Convert a decimal number (D) to its binary equivalent (B$). The seemingly spurious values at the end of lines 1130 and 1140 are required owing to inaccuracies in the calculations as a result of minor bugs in the Dragon's ROM.
2000-2090	Check the validity of a Hex entry and convert to decimal using the &H facility of the Dragon and thence convert to binary.
3000-3060	Check the validity of a binary entry, convert same to decimal and thence to Hex using the Hex$ function.
9000 & 9010	Display the error message in the event of an entry not passing the validity checks.
9100 & 9110	Display the results of the conversion.

```
1 REM CONVERTER:A PROGRAM TO CONVE
RT BETWEEN DECIMAL,HEX AND BINARY
2 REM (C) 1984 JAMES GREENALL
10 DIM B(16):N=1
20 CLS:PRINT"ENTER NUMBER FOLLOWED
 BY EITHER D(DECIMAL), H(HEX) OR B
(BINARY)":PRINT STRING$(32,CHR$(13
1));"  DECIMAL       HEX        BINAR
Y"
30 N=N+2:INPUT A$
40 D=0:FOR X=1 TO 16:B(X)=0:NEXT X
:H$="":B$=""
50 IF RIGHT$(A$,1)="D" THEN 1000
60 IF RIGHT$(A$,1)="H" THEN 2000
70 IF RIGHT$(A$,1)="B" THEN 3000
80 GOTO 9000
1000 REM DECIMAL NO. INPUT
1010 D=VAL(LEFT$(A$,LEN(A$)-1))
1020 IF D>65535 THEN 9000
1030 H$=HEX$(D)
1040 GOSUB 1100
1050 GOSUB 9100
1060 GOTO 30
1100 REM CONVERT DECIMAL TO BINARY
1110 Y=D
1120 FOR X=15 TO 0 STEP-1
1130 B(16-X)=INT ((Y/2^X)+.000005)
1140 Y=INT(Y-((2^X)*B(16-X))+.5)
1150 NEXT X         1160 B$=""
1170 FOR X=1 TO 16
1180 B$=B$+CHR$(B(X)+48)
1190 NEXT X
1200 RETURN
2000 REM HEX NO. INPUT
2010 IF LEN(A$)>5 THEN 9000
2020 FOR X=1 TO LEN(A$)-1
2030 IF ASC(MID$(A$,X,1))>70 OR AS
C(MID$(A$,X,1))<48 THEN 9000
2040 NEXT X
2050 H$=LEFT$(A$,LEN(A$)-1)
2060 D=VAL("&H"+H$)
2070 GOSUB 1100
2080 GOSUB 9100
2090 GOTO 30
3000 REM BINARY NUMBER INPUT
3010 B$=LEFT$(A$,LEN(A$)-1)
3015 IF LEN(B$)<16 THEN LET B$="0"
+B$:GOTO 3015
3020 FOR X=1 TO LEN(A$)-1:IF MID$(
A$,X,1)<>"1" AND MID$(A$,X,1)<>"0"
 THEN 9000 ELSE NEXT X:IF LEN(A$)>
17 THEN 9000
3030 FOR X=15 TO 0 STEP-1:D=INT(D+
2^X*VAL(MID$(B$,(16-X),1))):NEXT X
3040 LET H$=HEX$(D)
3050 GOSUB 9100
3060 GOTO 30
9000 PRINT @32*(N+1),"INVALID INPU
T - TRY AGAIN";:N=N-2
9010 GOTO 30
9100 PRINT @32*(N+1),"  ";D;:PRINT
 TAB(15);H$;:PRINT TAB(23);LEFT$(B
$,8):PRINT TAB(23);RIGHT$(B$,8)
9110 RETURN
```

Budget

From D L George in Sussex

I WOULD imagine there are a lot of people who have regular financial commitments throughout the year. The difficulty is that payments tend to be irregular, some are quarterly, some paid over part of the year, some are seasonal and others are "one-offs".

This program provides a monthly review of the current situation, suggests an amount to be "carried forward" and tells you how much you can actually spend?

As listed the program only calls for two Inputs, the amount "brought forward" from the previous month and single "income" (salary). It would not be difficult to introduce multiple "incomes", for example the daily takings from a small shop, weekly subs from a club, and so on. Furthermore, if you wanted the gruesome details, a routine could be introduced listing the actual outgoings.

Line 13150 checks the average for the current month and the next one under review. If the outgoings for this month are less than the average for the two months, it recommends a minimum amount to ▶

◄ C/F. If your are the cautious type, or if the monthly commitments vary wildly then I suggest rewriting line 13150 as follows:
IF X5 > X3 THEN X7 = (X5 − X3) / 2:
IF X6 > X3 THEN X7 = (X6 − X3) / 2:
IF J4 > X3 THEN X7 = (J4 − X3) / 2:
?USING and so on.

Once on tape, you only have to RUN the program once a month, enter the amount you can spend in your cheque book, then enjoy a little peace of mind.

Program notes

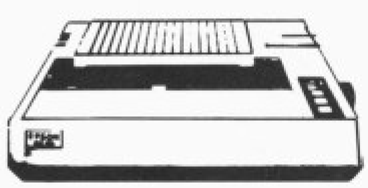
Lines	
10-250	Lists individual amounts to be budgeted and assigns variable names (REM: A to C available).
260-370	Assigns variable names to the lists of items per month.
400-640	Averages monthly totals over: 1. Two month period. 2. Three month period (both include "current" month). 3. For the year. Assigns variable names.
700-980	Lays out initial display and routing per month. Includes "mug-trap".
1000-12050	Re-allocates selected variables per month preparatory to the final routine. Prints headings per month and routes program to final display.
13000-13240	Requests two Inputs. Specifies relationship of variables. Assiç inputs. able names. Prints final display and result of calculations. Includes safety check when sum of B/F and income are less then net outgoing.
14000-14140	Check routine.

```
1 '           D*R*A*G*O*N
2 '         BUDGET ANALYSIS
3 '             PER MONTH
4 'LIST ITEMS TO BE BUDGETTED
  FOR IN LINES 10-250 AND ALLOCATE VARIABLES.
5 'LIST COMBINATION OF VARIABLES BY MONTH IN LINES 260-370.
6 'PRESS /RUN/
7 'DAVE GEORGE,33 VICTORIA ROAD, SHOREHAM-BY-SEA,WEST SUSSEX.
8 'MAY 1983
10 A0=178.47'MORT/HP/LOAN/INS
20 A1=46.00'TV LIC
30 A2=14.13'COUNCIL RATE
40 A3=14.04'COUNCIL RATE
50 A4=6.36'WATER RATE
60 A5=6.35'WATER RATE
70 A6=60.00'GRD RENT & MAINT
80 A7=50.00'GAS PROVISION
90 A8=50.00'ELECT. PROVISION
260 D1=A0                  'APRIL
270 D2=A0+A2+A4            'MAY
280 D3=A0+A3+A5+A7+A8      'JUNE
290 D4=A0+A1+A3+A5         'JULY
300 D5=A0+A3+A5            'AUGUST
310 D6=A0+A3+A5+A6+A7+A8   'SEPT
320 D7=A0+A3+A5            'OCTOBER
330 D8=A0+A3+A5            'NOVEMBER
340 D9=A0+A3+A5+A7+A8      'DECEMBER
350 E0=A0+A3               'JANUARY
360 E1=A0+A3               'FEBRUARY
370 E2=A0+A6+A7+A8         'MARCH
400 H0=(D1+D2)/2
410 H1=(D1+D2+D3)/3
420 H2=(D2+D3)/2
430 H3=(D2+D3+D4)/4
440 H4=(D3+D4)/2
450 H5=(D3+D4+D5)/3
460 H6=(D4+D5)/2
470 H7=(D4+D5+D6)/3
480 H8=(D5+D6)/2
490 H9=(D5+D6+D7)/3
500 I0=(D6+D7)/2
510 I1=(D6+D7+D8)/3
520 I2=(D7+D8)/2
530 I3=(D7+D8+D9)/3
540 I4=(D8+D9)/2
550 I5=(D8+D9+E0)/3
560 I6=(D9+E0)/2
570 I7=(D9+E0+E1)/3
580 I8=(E0+E1)/2
```

Continued on page 37

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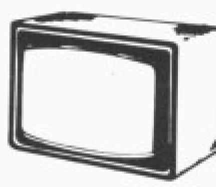
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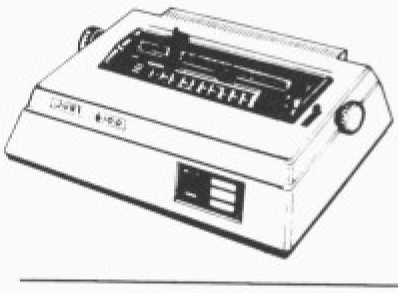
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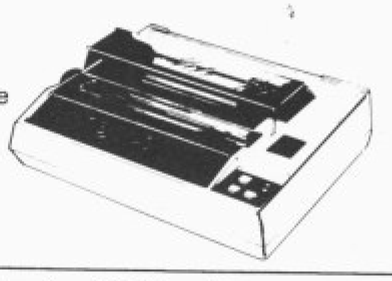
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600 J0=(E1+E2)/2
610 J1=(E1+E2+D1)/3
620 J2=(E2+D1)/2
630 J3=(E2+D1+D2)/3
640 J4=(D1+D2+D3+D4+D5+D6+D7+D8+D9+E0+E1+E2)/12
700 AX$="$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$"
701 CLS
710 PRINT@64+10,"D*R*A*G*O*N";
720 PRINT@96+8,"BUDGET ANALYSIS";
730 PRINT@160,AX$
740 PRINT@224+8,"TYPE FIRST THREE";
750 PRINT@256+8,"LETTERS OF MONTH";
760 PRINT@320+14,"AND";
770 PRINT@352+12,"/ENTER/";
780 PRINT@416,AX$
790 INPUT AM$
800 IF AM$="APR"THEN GOTO 1000
810 IF AM$="MAY"THEN GOTO 2000
820 IF AM$="JUN"THEN GOTO 3000
830 IF AM$="JUL"THEN GOTO 4000
840 IF AM$="AUG"THEN GOTO 5000
850 IF AM$="SEP"THEN GOTO 6000
860 IF AM$="OCT"THEN GOTO 7000
870 IF AM$="NOV"THEN GOTO 8000
880 IF AM$="DEC"THEN GOTO 9000
890 IF AM$="JAN"THEN GOTO 10000
900 IF AM$="FEB"THEN GOTO 11000
910 IF AM$="MAR"THEN GOTO 12000
920  CLS4
930 FOR I=1 TO 50
940 PRINT@96+14,"T!R!Y";
950 PRINT@160+12,"A!G!A!I!N";
960 PRINT@224+10,"FUMBLE FINGERS";
970 NEXT I
980 GOTO 710
1000 CLS
1010 PRINT"    ANALYSIS MONTH OF APRIL"
1020 X3=D1
1030 X5=H0
1040 X6=H1
1050 GOTO 13000
2000 CLS
2010 PRINT"     ANALYSIS MONTH OF MAY"
2020 X3=D2
2030 X5=H2
2040 X6=H3
2050 GOTO 13000
3000 CLS
3010 PRINT"    ANALYSIS MONTH OF JUNE"
3020 X3=D3
3030 X5=H4
3040 X6=H5
3050 GOTO 13000
4000 CLS
4010 PRINT"    ANALYSIS MONTH OF JULY"
4020 X3=D4
4030 X5=H6
4040 X6=H7
4050 GOTO 13000
5000 CLS
5010 PRINT"   ANALYSIS MONTH OF AUGUST"
```

Continued on page 38

```
5020 X3=D5
5030 X5=H8
5040 X6=H9
5050 GOTO 13000
6000 CLS
6010 PRINT"  ANALYSIS MONTH OF SEPTEMBER"
6020 X3=D6
6030 X5=I0
6040 X6=I1
6050 GOTO 13000
7000 CLS
7010 PRINT"   ANALYSIS MONTH OF OCTOBER"
7020 X3=D7
7030 X5=I2
7040 X6=I3
7050 GOTO 13000
8000 CLS
8010 PRINT"   ANALYSIS MONTH OF NOVEMBER"
8020 X3=D8
8030 X5=I4
8040 X6=I5
8050 GOTO 13000
9000 CLS
9010 PRINT"   ANALYSIS MONTH OF DECEMBER"
9020 X3=D9
9030 X5=I6
9040 X6=I7
9050 GOTO 13000
10000 CLS
10010 PRINT"   ANALYSIS MONTH OF JANUARY"
10020 X3=E0
10030 X5=I8
10040 X6=I9
10050 GOTO 13000
11000 CLS
11010 PRINT"   ANALYSIS MONTH OF FEBRUARY"
11020 X3=E1
11030 X5=J0
11040 X6=J1
11050 GOTO 13000
12000 CLS
12010 PRINT"    ANALYSIS MONTH OF MARCH"
12020 X3=E2
12030 X5=J2
12040 X6=J3
12050 GOTO 13000
13000 PRINT AX$;
13010 INPUT "TOTAL B/F:";X0
13020 INPUT"INCOME:";X1
13030 X2=X0+X1
13035 X4=X2-X3
13040 IF X2<X3 GOTO 14000
13050 PRINTUSING"TOTAL AVAILABLE:     +**££££.££";X2
13060 PRINT AX$;
13070 PRINTUSING"LESS NET OUTGOINGS: **££££.££";X3
13090 PRINTUSING"GROSS DISPOSABLE:    +**££££.££";X4
13100 PRINT AX$;
13110 PRINTUSING"AV THIS/NEXT:        **££££.££";X5
13120 PRINTUSING"AV FOR QUARTER:      **££££.££";X6
13130 PRINTUSING"AV FOR YEAR:         **££££.££";J4
13140 PRINT AX$;
13150 IF X5>X3 THEN X7=(X5-X3)/2:PRINTUSING"RECOMMEND
      MIN C/F:  **££££.££";X7
```

```
13160 X8=X2-(X3+X7)
13170 PRINTUSING"NET DISPOSABLE:      +**££££.££";X8
13180 GOTO 13180
14000 CLS8
14005 FOR J=1 TO 100 STEP 2
14020 PRINT@32+12,"D!O!N!T";
14030 PRINT@64+11,"P!A!N!I!C";
14050 PRINT@160+3,"CREDIT LESS THAN OUTGOINGS";
14060 PRINT@192+5,X2" MINUS "X3" = "X4
14080 PRINT@320+5,"IF YOU MADE A MISTAKE";
14090 PRINT@384+8,"/BREAK/ & /RUN/";
14100 PRINT@448+5,"OTHERWISE DO NOTHING";
14110 NEXT J
14120 CLS
14125 PRINTAX$;AX$;AX$
14130 GOTO 13050
```

Tron

From C Crowther in West Yorkshire

THIS PROGRAM simulates the Death Bikes in the film Tron. It is a game for two players, using inverted joysticks (I find they are easier to use this way) and each player has to force the other to crash into the court boundaries; the random vertical lines or the trail left behind the bikes. Sometimes it is possible to cross the trail on diagonal and traps can be set.

I have used PCOPY to store the court into memory and also to bring them bck. Full instructions are included in the game. Do not centre your joystick at the beginning of the game as this will cause your bike to automatically crash.

Program notes

10-30	Asks for instructions.
40-120	Sets and "readies" screen.
120	Sets vriables for score.
130-170	Returns screen.
180-220	Reads joycsticks, checks for crash, plots pixel for yellow.
230-260	Reads joysticks, checks for crash, plots pixel for blue.
280-300	Adds score.
310-330	Draws low-res screen and displays scores.
340	Checks for a winner.
350-360	Starts game.
380-430	Displays winner and returns to new game.
440	Displays instructions.

Variables

SS	Blue score
VS	Yellow score
X,Y	Yellow's position
X1,Y1	Blue's position

```
10 CLS:PRINT"DO YOU WANT INSTRUCTI
ONS? (Y/N)"
20 I$=INKEY$:IF I$=""THEN 20
30 IF I$="Y"THEN GOSUB440 ELSE GOT
O40
40 PCLEAR6
50 PMODE1,3
60 PCLS
70 LINE(0,0)-(0,192),PSET:LINE-(25
5,192),PSET:LINE-(255,0),PSET:LINE
-(0,0),PSET
80 PMODE1,5
90 PCLS
100 PCOPY3 TO 5:PCOPY4 TO 6
110 Q=RND(150):LINE(50,50)-(50,50+
Q),PSET:LINE(200,50)-(200,50+Q),PS
ET
120 SS=0:VS=0
130 GOTO310
140 X=RND(2)
150 PCOPY(X*2)+1 TO 1
160 PCOPY(X*2)+2 TO 2
170 PMODE1,1:SCREEN1,0
180 X=120:Y=90:X1=100:Y1=90
190 X=X+2*(JOYSTK(0)>51)-2*(JOYSTK
(0)<12)
200 Y=Y+2*(JOYSTK(1)>51)-2*(JOYSTK
(1)<12)
210 IF PPOINT(X,Y)<>1 THEN 300
220 PSET(X,Y,2)
230 X1=X1+2*(JOYSTK(2)>51)-2*(JOYS
TK(2)<12)
240 Y1=Y1+2*(JOYSTK(3)>51)-2*(JOYS
TK(3)<12)
250 IF PPOINT(X1,Y1)<>1 THEN 280
260 PSET(X1,Y1,3)
270 GOTO190
280 VS=VS+1
290 GOTO310
300 SS=SS+1
310 CLS RND(8):PLAY"T5503CDEFFCDEF
FCDEFGO4AAABB":PRINT@12,"++++++++"
;:PRINT@44,"+      +";:PRINT@64,"+
++++++++++++ TRON +++++++++++++";:
PRINT@108,"+      +";:PRINT@140,"+
+++++++";
320 PRINT@193,CHR$(128);"LEFT PLAY
ER";CHR$(128);"   ";CHR$(128);"RIG
HT PLAYER";CHR$(128);
330 PRINT@263,SS;:PRINT@279,VS;
340 IF SS=10 OR VS=10 THEN 380
350 PRINT@453,"PRESS BOTH FIRE BUT
TONS";
360 IF PEEK(65280)<>124 AND PEEK(6
5280)<>252 THEN 360
370 GOTO140
380 IF SS=10 THEN CLS RND(8): PRIN
T@167,"left";CHR$(128);"player";CH
R$(128);"wins";:PLAY"T5004CDEFGABC
DEFGABCDEFGAB":GOTO400
390 IF VS=10 THEN CLS RND(8):PRINT
@167,"right";CHR$(128);"player";CH
R$(128);"wins";:PLAY"T5004CDEFGABC
DEFGABCDEFGAB"
400 PRINT@426,"PRESS A KEY";
410 PRINT@456,"FOR A NEW GAME.";
420 I$=INKEY$:IF I$="" THEN 420
430 RUN 10
440 CLS:PRINT@77,"TRON";:PRINT@108
,"======"
450 PRINT:PRINT"TRON IS A GAME FOR
 TWO PLAYERS  IN WHICH YOU HAVE TO
 GUIDE YOUR CYCLE AROUND THE SCREE
N WITHOUT TOUCHING THE EDGES OF TH
E SCREEN,THE VERTICLE LINES WHICH
APPEARRANDOMLY OR MOST OF ALL THE
LINETRAIL LEFT BY YOURSELF OR YOUR
  OPPONENT.";
460 PRINT"CENTERING THE JOYSTICK W
ILL IMMEDIATELY KILL YOU."
470 PRINT@453,CHR$(197);"PRESS ANY
 KEY TO START";CHR$(202)
480 I$=INKEY$:IF I$=""THEN 480 ELS
E RETURN
```

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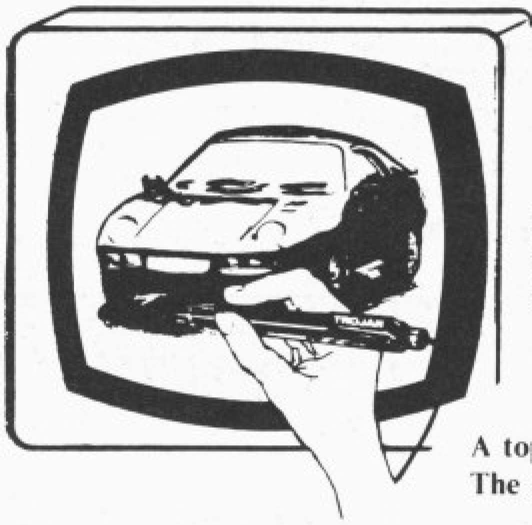
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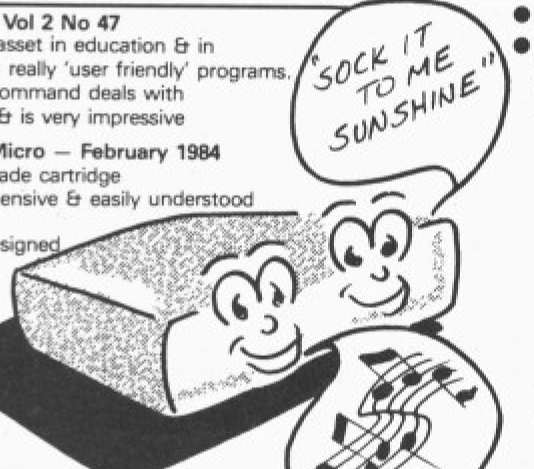
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THE DRAGON has never been the best machine for the avid adventurer, though there are certainly some good titles available, and six months ago *Dragon User* could not have considered a regular adventure page because of the lack of material. However, with a resurgence of interest in this kind of game, and with a flood of popular adventures now being converted to the Dragon, we can launch this monthly feature with a look at the best of the old and a few of the new.

Rare treat

Just about the only adventure that is still unsolved is **Pimania** from Automata, one of the first to appear for the Dragon and a rare treat in being an adventure with a sense of humour, as you discovered if you swore at the Pi-Man, who accompanies you on your quest for the Golden Sundial of Pi, worth £6,000. In this game you wander around various locations, answering questions, collecting objects, solving riddles and picking up clues to the Sundial's whereabouts. It's an amusing and infuriating game, with several cartoon sequences and good use of the Dragon's sound facilities, giving you everything from The Funeral March to The Hokey-Cokey — and it is important not to get these two confused unless you want to be buried to the sound of "You put your left leg in . . ." It's a bit of an old-stager now, but still worth checking out if you haven't sampled the Automata style of humour.

Also standing the test of time is Wintersoft's **The Ring of Darkness,** in which you search for that ring, Shedir, that's hidden somewhere in the enchanted land that you see displayed before you when you begin. It's a land of lakes, forests and rivers, but with less delightful features such as bandits and giant rats, too. You move around using the cursor keys, with text being printed beneath the map, and separate graphics displays appearing as you reach different features, including a 3D maze which you must LOAD from another program if you stumble across it. Even at £10 it's good value for money, and an exceedingly difficult adventure to solve.

Microdeal has undoubtedly made itself king of the arcade game, but it's a shame that it hasn't done the same for adventures. Its first four (**Mansion, Jerusalem, Williamsburg** and **Ultimate**) were all in Basic and extremely disappointing, but the later release of **Keys of the Wizard** more than made up for that. Machine language this time, and featuring over 200 locations, it has three skill levels and sets you the task of finding treasures and returning them to the Sanctuary, assuming you can find the Sanctuary, while simultaneously beating off the beasties that populate the game.

I'd put Keys of the Wizard high up on my Dragon adventure list, with **Madness and the Minotaur** from Dragon Data up there too. The setting this time is the labyrinth beneath the castle of King Minos in ancient Crete, with the tasks being very tricky indeed. Dragon Data has also just published four graphics adventures — two new titles, **Sea Quest** and **Shenanigans,** and two old ones with graphics added, **Black Sanctum** and **Calixto Island.** To be honest, I didn't find them too difficult as adventures, managing to solve a couple of them in three or four hours each, but the moving graphics are very impressive indeed, and you should try to have a look at one of them, at least.

Salamander's Dan Diamond character has proved to be popular with many, though I find him highly resistible, preferring instead Salamander's other adventures, **Wings of War** and **The Cricklewood Incident,** although the latter with its mad *Pythonesque* humour may well not appeal to traditional adventure fans.

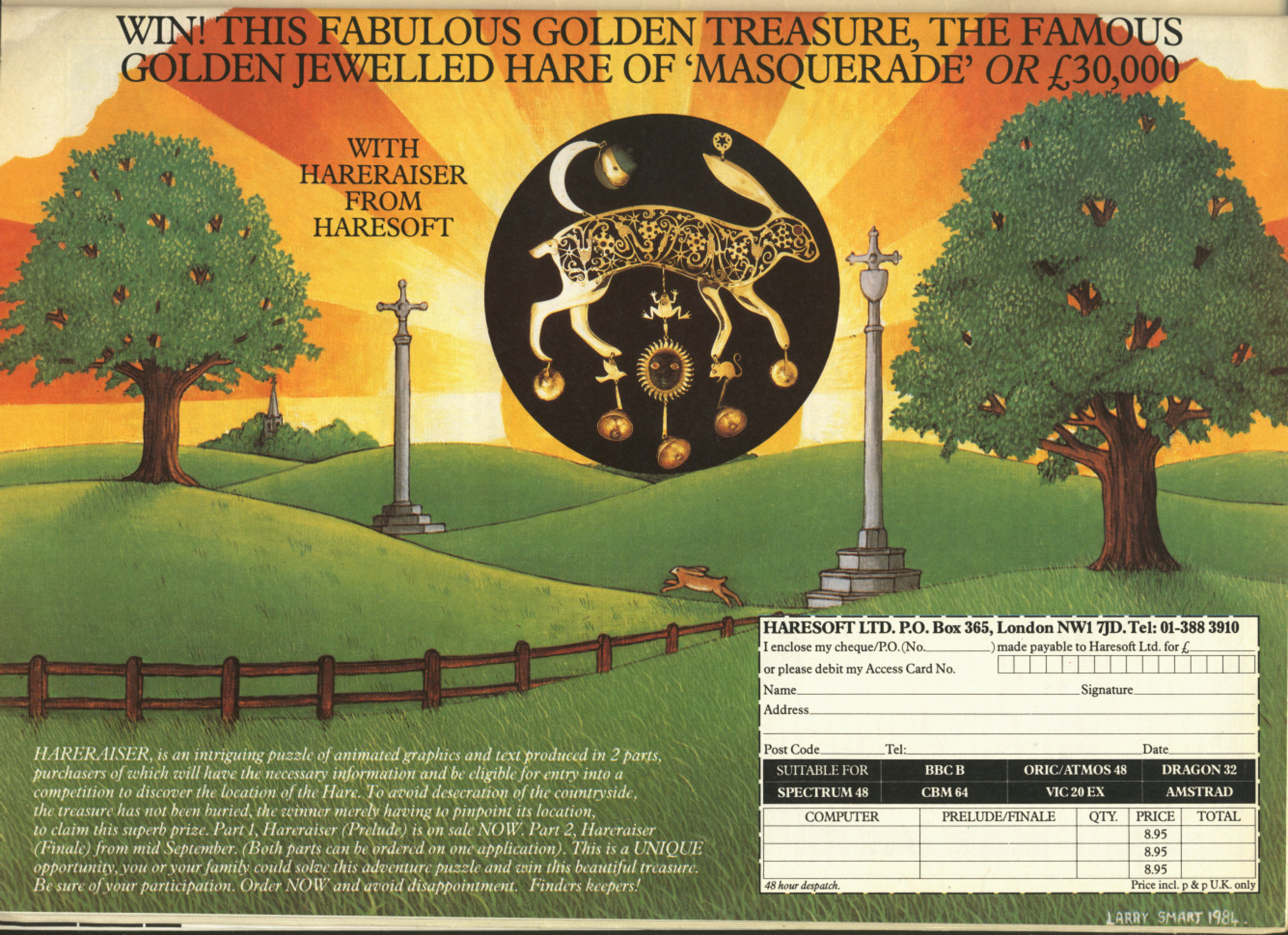
The two new titles that have come my way this month are **Touchstone** from Microdeal, a hybrid arcade-adventure, and Dragon Data's **Monsters and Magic,** which is text-only. Touchstone is in Tutankhamun-style, and you use your joystick to manoeuvre your character through a network of mazes, searching for the Touchstone itself, located at the last of the 11 levels. Each level has from one to five doors for you to pass through, the keys being scattered in such a way that you frequently have to go back to earlier levels to obtain one, as you can only carry one at a time. Needless to say, the mazes are heavily populated with nasties such as snakes and spiders, and Touchstone is highly recommended if you like your arcade games to have a touch of the quest about them.

Though more in traditional adventure style, Monsters and Magic was less impressive but should still appeal to those "D&D" fans who are used to the roll of a dice deciding the outcome, rather than adventure fans who believe that logical deduction is the only answer. In this game you choose your character's abilities, and decide how many monsters from one to 50 you should have to defeat before coming face to face with the evil Dungeon Lord. Higher numbers are in fact better as they allow you to build up the strength and experience you'll need for the ultimate encounter.

Frustrating

There are something like 1,000 different place descriptions, though you can imagine how brief those must be, and with gold to find, weapons to buy, spells to avoid and monsters to confront it's a game with a lot of variety, but I found it frustrating to have your progress halted by the unfortunate throw of a dice. More one for younger players, perhaps, rather than those who like to puzzle out a problem.

After this necessarily brief introduction to several adventures, in future columns I'll look in more detail at the newer releases as they appear. The Scott Adams and Level 9 series of adventures are said to be on their way for Dragon owners, and next month I hope to look at the popular Mysterious Adventures series, which are on the verge of release. Things are definitely looking brighter for Dragon adventurers these days.■



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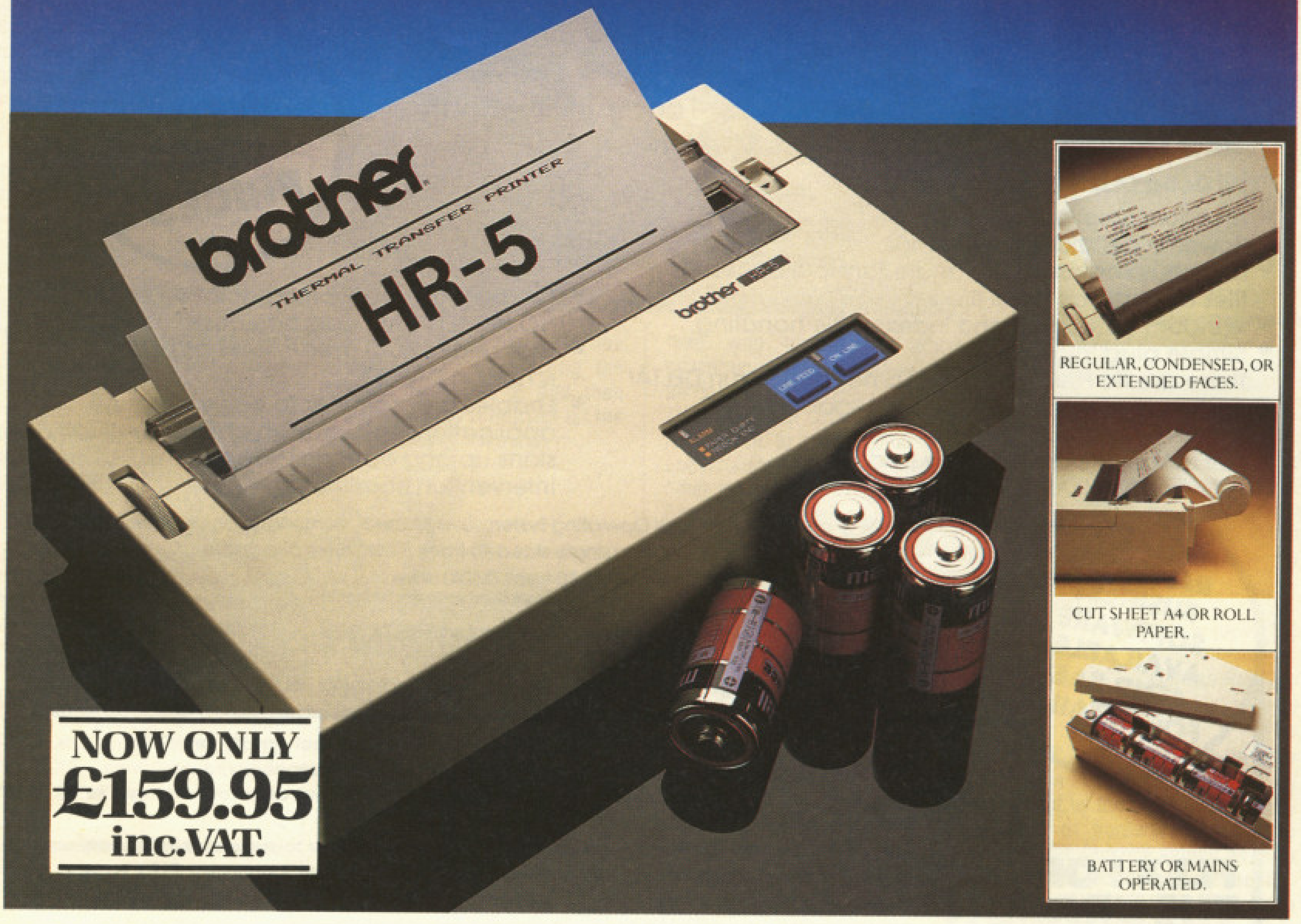
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Dragon Answers

Games graphics

IS THERE a cassette available for the Dragon 32 which allows you to make up your own arcade games with graphics, sound effects, explosions, scores, lives and so on?

I already know of a program that does these things but it is for the Vic 20 called "Games Designer" by Galactic Software.

Sameer Huda
Dungannon
County Tyrone

THE SORT of program you are after is "Sprite Magic" from Merlin Microsystems. This 8k program adds many new commands to Basic to allow you to control up to 128 sprites (true sprites, not just UDG characters). There is also a very powerful Beep command with 16 pre-programmed sound effects and the facility to create your own; and a score command to handle this in arcade games. Sprite Magic is certainly the best utility program I have used and is reasonably priced at £17.25.

It is available direct from Merlin at 93 High Street, Eston, Cleveland, or from the mail order department at Dragon Data.

Random routine

AT PRESENT I am writing a machine code arcade type game on my Dragon, but I have come up against a rather annoying problem.

How do I generate a random number in machine code? I wish to set the X register to a random address which will position a character somewhere on the first four pages of graphics memory. Is there a ROM routine that I can call up somwhere?

Steven Leppard
Forest Gate
London

ALTHOUGH it is quite a short algorithum to produce "random" numbers from machine code, there is a ROM routine that we can use instead. This routine starts at 38798 and returns a "random" number between 0 and 255 in location 278. This is part of the basic RND function.

To get a random number in



the X register, simply call the routine twice, transferring the number to A and B and then exchanging the D register for the X register. For example:

```
JSR   38798
LDB   278
JSR   38798
LDA   278
TFR   D,X
```

Finding the light

I READ the article in April's *Dragon User* about building a lightpen and was very interested, though I am unsure as to what purpose it may be put. Can you give me some ideas as to the capabilities and uses of the lightpen?

Brian Cullen
Wicklow
Eire

THE VARIOUS lightpens that can be bought for the Dragon all use the joystick port to read the light intensity from the pen. This means that, in theory anyway, you should be able to read all the different colours from the screen using the pen, making it useful for menu selection and the like.

No pens that I know of for the Dragon can return the X-Y position of the pen on the screen in the same way as those for some other machines do, so their use for "drawing" is somewhat limited.

Dial a Dragon

I AM becoming increasingly interested in the idea of telephone networking via my Dragon 32. I read, with interest, the article concerning the new Prestel adaptor in the April issue of *Dragon User*, but I am reluctant to commit myself to this system as I understand it is incompatible with other networks, such as Bulletin Board Systems, for example.

I have searched the pages of *Dragon User* for information on terminal software, but without success. Also, I am confused by the variety of RS232 interfaces available for the Dragon as I understand some are unsuitable for telephone networking purposes. Which RS232 interface should I buy, and where can I obtain suitable software, or will I have to write my own?

E A Parr
Peristone
Sheffield

COTSWOLD Computers have recently released a package for the Dragon 32 which includes RS232 interface, telecom approved modem, cables and software. This will allow you to access most services and bulletin boards. The package may seem a little expensive to most users at £154, but it does include all you need to get "on line". For more details contact Cotswold Computers on 0608 41232.

Saving arrays

PLEASE could you tell me how to save arrays on tape.

I have looked in the Dragon manual and have not been able to find out how to do so.

Andrew Gannon,
Solihull,
West Midlands.

TO DO this you need to use cassette files. Suppose the array to be saved is called D$ and has N elements, to save this to a file called DATA1 you would use:

```
100 OPEN "O", -1, "DATA1"
110 FOR I = 1 TO N
120 PRINT# -1, D$(I)
130 NEXT I
140 CLOSE# -1
```

and to reload the data from tape you would use:

```
100 OPEN "I", -1, "DATA1": N
    = 0
110 IF NOT EOF(-1) THEN N =
    N + 1: INPUT# -1, D$(N):
    GOTO 110
120 CLOSE
130 ' Rest of program . . .
```

Busily buzzing

I HAVE noticed that when I run the program listed below, I hear a buzzing sound and as I move the joystick the noise changes. Is this some sort of feedback? Is my Dragon faulty?

```
10 Audio on
20 A = joystk (0): B = joystk (1)
30 Goto 20.
```

Duncan Rowland
Bassingham
Lincs

THERE is no problem with your Dragon here, the buzzing is caused by the fact that the same piece of hardware is used to read the joystick values as is to produce sound through the TV. Typing AUDIO ON allows you to "hear" the joysticks being read. The remedy is, if you must use audio with joysticks, use AUDIO OFF before reading them.

Card edge connectors

I AM experiencing a problem in finding a retail outlet or mail order company that sells the "2 x 20-Way" edge connector as used on the cartridge port of the "Dragon 32" computer. Can you be of any help?

A Rand
London

TANDY SELL suitable card edge connectors which can be cut to the convenient size for the Dragon for only a few pounds. They can also supply ready-made experiment boards for building your own cartridges on. Alternatively, I suggest you consult the Maplin catalogue available from most newsagents including W H Smith's.

RETURN OF THE RING

THE RING OF DARKNESS PART II

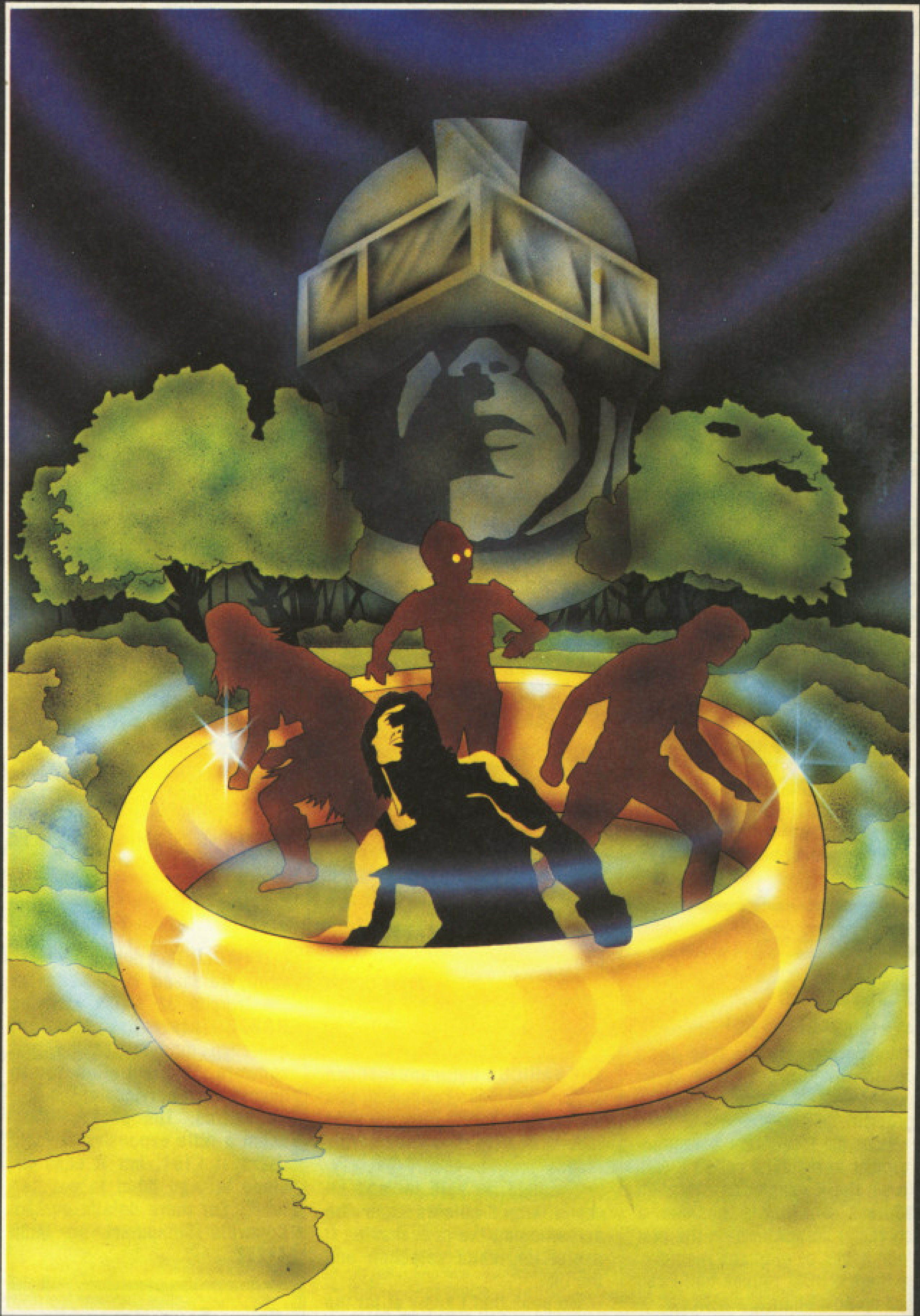
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SOFTWARE EXCHANGE. Send quality Dragon cassette with 75p p&p for similar cassette to: I. Richardson, 5 Chiltern Way, Tring, Herts HP23 5JX.

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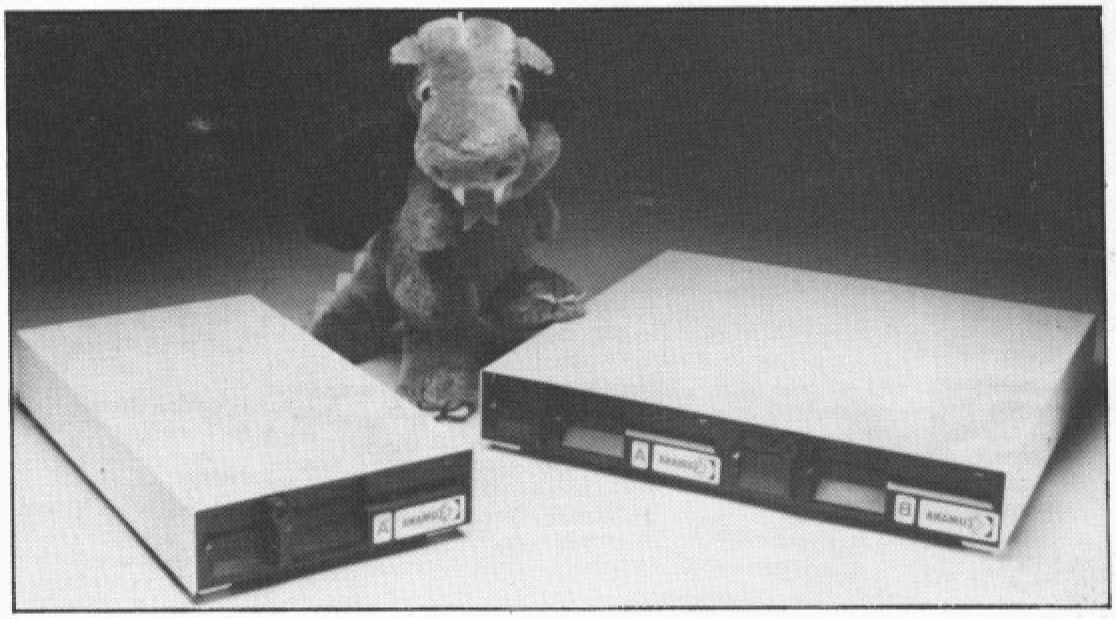
ADVERTISERS INDEX

Competition Corner

Answers to Competition Corner, *Dragon User*, 12/13 Little Newport Street, London WC2R 3LD

Cracking the code

*Win Cumana's disk drives in **Gordon Lee's** key-code quiz*



EVER SINCE the spoken language first came to be written down, there have been instances where person "A" wishes to send a message to person "B" such that if it is intercepted by person "C", that message would be indecipherable. In other words "A" and "B" would employ a sort of secret code. Certainly, in comparatively recent times, codes were in use in 15th century Arabia; and in Egypt in 1412 a fourteen volume encyclopaedia on cryptanalysis was written by a certain Qalqashandi.

The use of codes by their very nature suggests the existence of personal or political intrigues, but probably their greatest use is for military purposes. They were certainly used during the American Civil War, and the First World War. As an example of the importance of these codes, the Russians lost the battle of Tannenberg in 1914 as a result of poor cryptography which allowed the enemy to decipher the Russian messages. More recently, the use of codes during the Second World War led to the development of cipher machines, from which the modern electronic computer is a descendant.

Decipherment

The alpha-numeric handling of computers, coupled with their speed of operation, makes them ideal for use in encoding secret messages, and also in breaking such codes. Perhaps the simplest form of code is that known as "monoalphabetic substitution" in which each letter is transposed for another, say A = P, C = L and so on. Unfortunately, it is also one of the easiest codes to break, and the longer the message the easier this becomes. For example, in English, the most frequently occurring letter in ordinary text is "E", followed by T, N, R, O, A, I, S, D, and L (the actual order may vary depending on the source quoted), so the most frequently appearing letter in the coded message stands a good chance of being an "E". Also, this code makes no attempt to disguise word lengths which makes decipherment easier.

Nevertheless, using a computer we can produce reasonably secure messages quite simply by use of a key-code, and also by including any space as an extra letter of the alphabet. This device will effectively disguise both the frequency at which letters occur in the message and also the word lengths.

In practice, if we regard the alphabet in cyclical form with the "space" occurring between "Z" and "A", we can encode a message by advancing letters a predetermined number of times. So "Z" advanced once will become a space (for convenience this will be shown as '/'), advanced twice will become "A", three times "B" and so on. Clearly, if each letter were advanced by the same amount the code could be broken quite easily, so a key-code or sequence of digits is used. For example, if we used the 5-digit key-code "64157", we would first write the message with the "key-code" written beneath it — repeated as necessary to the end of the text. Each letter is then advanced by the number of letters denoted by the digit appearing below it.

```
H A P P Y / B I R T H D A Y
6 4 1 5 7 6 4 1 5 7 6 4 1 5
N E Q U E F F J W / N H B C
```

Note how, for example, the two "P's" in the original message now appear as different letters in the code. Also note how the word lengths alter. To decode the message simply reverse the process. All that is necessary is knowledge of the code. As an alternative to a key-code a key-word could also be employed — each letter indicating the shift required A = 1, B = 2 and so on. So the code word "SECRET" would be given the numerical sequence 19, 5, 3, 18, 5, 20.

Here is a coded message that has been encoded using the method just described with a three-digit code. As a clue, it is the sort of sentence that you might find in this magazine!

G/IGTHXQQWIWRIFSCZDLWQYBXNZD
JVHIFSCHQJFDEQRIALR/DVWRBPWIL
VJOSWHYAMVIKSVXIBQXRWR.

Can you decipher it, and state also, the key-code used?

Prize

THIS MONTH Cumana is offering two prizes worth more than £600: first prize is its dual disk drive system, the DD500, and second is the single drive equivalent, the DS250.

The DS250 is a single-sided 40-track drive giving 180K bytes of formatted storage capacity in double-density recording mode. The dual unit doubles this capacity.

Each drive is supplied with demonstration diskette, connecting cable, manual and the Delta disk operating system. An independent power supply, mains lead and moulded plug are included in each pack.

Rules

TO WIN the disk drives you must show both the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon.

Your entry must arrive at *Dragon User* by the last working day in August. The winners — and solution — to the puzzle will be published in our November issue. Entries will not be acknowledged and we are not able to enter into correspondence on the result.

As a tiebreaker, choose a name for the toy dragon shown in the photograph.

May winner

THE WINNER of our May competition and recipient of an Ultra Drive from Ikon Computer Products is R H Wilson of Basingstoke with a grid containing 123 primes.

A number of higher-scoring entries had to be disqualified as some entrants failed to realise that the digits "1984" had to remain in place on the grid, whilst others gave an incorrect listing of the primes on their grid.

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